RAILROAD GAZETTE

FRIDAY, APRIL 17, 1896.

CONTENTS

Contributions.

Some of the Difficulties in Designing Rail Sections.

NEW YORK, April 9, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In reply to your inquiry where to have "strictly accurate templates" made for rails, I would suggest sending the drawings of the sections to The Brown & Sharpe Manufacturing Co. and have the templates made according to U. S. standard measures. These would serve as reference templates from which other male and female templates could be made to use on the rails.

I have inserted in my specifications for rails for some years that for all dimensions given on the drawing for the sections and cold templates "the standard of measure to be Darling, Brown & Sharpe U. S. standard steel rules." As rails are rolled and sold by weight per yard, great care must be taken in drawing the section, that the area for the given weight per yard be accurately determined for the density of the steel from which the rails are to be rolled, which varies slightly in different mills due to different methods of manufacture. The difference in density is quite marked between rails rolled direct from the ingot and those rolled from reheated blooms.

The area of but few sections for the given weight per yard seems to be correctly determined on the drawings for the standard measures and weight before the dimensions are sent to the mills; the figures will not be corrected there. A part of this discrepency in the area is due, in laying out the section, to the use of scales originally inaccurate, or that have become so since they were divided; the stamp of "U. S. Standard" on them being no longer a guarantee of their correctness. A fine 12-in. U. S. Standard scale divided in 1894, and used daily in August and September of that year is now 0.012 of an inch shorter than when I obtained it, most of the error being in the six inches principally handled and used. An expensive English ivory scale I have is $\frac{1}{32}$ of an inch short in 12 in., and is only used when I wish to compute an English section from the dimensions given per yard. An English section laid out with our U. S. Standard I have always found to exceed the weight given per yard. My 80-lb. section, rolled in England, is lower than our standard measures, the weight being made up by a slight increase in thickness of web and head.

At the mills the dimensions for the section go to the roll designer, who determines and lays out the passes for the rolls on paper, estimating the allowance to be made for draft, flow, speed and shrinkage of the hot metal. Then the hot templates are made, from which to turn the rolls.

The rolls are driven according to their pitch diameter, and those portions of the pass which are sunk deep into the body of the rolls, the bottom of the pass being so much less than the pitch diameter, describe a less distance; therefore the metal in some portions of the pass must slip. This becomes a very serious matter for the manufacturer with sections having wide flanges, as the extreme width must slip through the bottom of the pass faster than the bottom of the rollers is moving and a great many seconds will be made unless the angle for the base is large, for good delivery. Outside of the mills little is known of the difficulties and intricacies of roll designing and turning and rolling the steel.

The shrinkage of the steel in the different types of sections cannot be the same, nor is it the same in all portions of the section. The more massive portions of the section have more heat units to be dissipated than the thinner portions, recalesence occurs at different times and the shrinkage is unequal. Of course allowance is made for this, but it only can be a mere approximation. In the light and low sections it was not so important or difficult as it is in the heavier and higher sections now in use. A bar finishing 100 deg. lower than the usual run will not shrink as much and will be higher. For the same reason there is often a slight difference in height between the rail from the top of the ingot and the one from the bottom. When the rolls are first turned they are intended to be low, and as they wear and are dressed, the height increases. Most specifications allow a variation of $\frac{1}{32}$ of an inch under and $\frac{1}{32}$ of an inch over the standard height. This is too much for the standard of track now desired for the present speed and heavy rolling stock.

When one looks at the rolls for a section and all the provisions which must be made for its rolling, one can readily see it is only by the great skill acquired by long experience, that as good work is produced as is generally turned out by the present system of rolling, being obliged to shape and form the section so largely by longitudinal flow of the metal.

P. H. DUDLEY.

Three-Position Signals and Permissive Blocking.

NASHVILLE, Tenn., April 10, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In an article on Signal Light Colors in your issue of the 3d inst., page 234, you express the opinion that three indications given with the same semaphore blade is unsatisfactory, and that the practice ought to be discontinued. What reason have you for so thinking? It strikes me that the three indications can be given with the same blade without danger of confusion, if the blade is brought down parallel with the mast, or nearly so, for the safety position, the blade to stand off from the mast 6 or 8 inches.

You also advise the use of caution cards or the like. Unless some means are provided for delivering these cards to the engineman, trains would have to slacken speed or come to a stop. Would it not be much better to use three-position signals and insure proper adjustment of them by connecting them up with the pipe instead of wire? If we are going to handle our trains with signals, why stop them for telegraphic train orders, clearance or caution cards?

While on the subject of three-position signals, I want to say a word in defense of permissive blocking. We sometimes hear it said that where permissive blocking is used, the men run as fast under caution as they do under safety signals. Is this state of affairs not brought about from the fact that the rules covering the speed of trains running under caution signals are not properly enforced? The men soon find that their speed while running under caution signals is not checked up promptly, they are not reprimanded when they exceed the limit a few miles per hour, they run faster and faster, a tail-end collision occurs and permissive blocking falls into bad repute; whereas, if they know that an accurate account is kept of their speed, that this record is closely scrutinized, and that they are held as accountable for exceeding a speed at which they cannot stop within the range of their vision while running under caution signals, as they are for running by a signal at danger, they soon learn what a caution signal means.

J. W. T., JR.

[If our correspondent will go into the American Railway Association and preach to the members with sufficient vigor to make them put into practice the theory which he has set forth in the last paragraph of his letter he will take away a part of the foundation of what we said in the article of April 3; and we should be glad to have him do so. But still the three-position signal would be objectionable, because it disturbs what otherwise would be a good degree of uniformity. Signal engineers will not make their two-position signals so that the arms will hang parallel to the post, and consequently the all clear indication, in these signals, is too much like the caution indication in the three-position. The necessity for the caution-card is found in the fact that, even with the best signals, the difference between running under a clear and under a caution signal is so radical that the engineman ought to have some material thing constantly before his eyes, when running under caution, to remind him of the fact. Perfectly satisfactory apparatus to deliver cards to enginemen need not be expensive.—EDITOR RAILROAD GAZETTE.]

The Uses of Momentum Grades.

TROY, N. Y., April 12, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The following remarks are suggested to the writer by the recent paper of Mr. Vaughan, of the Northern, on the "Hauling Capacity of Locomotives." For a number of years the writer has taught the use of momentum grades in effecting economies in the operation of railroads, and has advocated the tonnage rating of locomotives. He has almost uniformly met from railroad managers and engineers the statement that this, so far as the momentum grades are concerned, is folly; that a locomotive must not be sent out with a greater load than it can start from rest on the steepest portion of the division over which it runs. The writer has held, on the other hand, that while it is very certain that the full theoretic effect of the energy stored in a train at a given velocity can never, or hardly ever, be utilized, nevertheless there is some more or less definite practical limit within which it is perfectly proper to rely on overcoming grades by surrendering velocity previously acquired.

The arguments that are presented on the other side are various. "We cannot count on always securing the right velocity at the right place and so the movement of our trains would be uncertain." "Our variations in loading, owing to various causes, among which is variation in condition of track, are such that we cannot allow for the use of stored energy" because—I suppose—it would be impossible to keep track of just how much would be needed under differing conditions. "On roads of our business we cannot depend on anything of this kind because the stalling of a single train means too much to us."

The first two statements may almost be passed without notice, for the load that the engine can haul is always determined by experiment and the result for varying conditions of track can be as certainly determined when momentum grades are used as when they are not. There is *nothing certain*, and the condition of the track at a critical point may be very different when the train gets there from what it was supposed to be when the train was made up. No fine work of loading the engine up to just what it can haul to-day with a temperature of so much and a hygrometric condition of atmosphere of such and such per cent. is ever attempted. A practical loading for summer and another for winter are determined and this is usually sufficient. A large safety factor is used. The same degree of precision with just as large safety factor can be determined by trial for momentum grades often adding one or two or more cars to the rating.

The third statement seems to be more plausible. A stoppage on a line of large business means a great deal. But how much is the danger of stoppage increased by the proper use of momentum grades at some one or more points? If the theory is strained beyond its practical limit the danger is increased But it is not necessary to carry it thus far.

The question seems to me to be not: Does it mean a great deal? but How much does it mean? And how much does it mean to save one or more trains a day at the expense of one or two stoppages a year, and possibly no more than now? On two lines with which I am acquainted I know it to be possible to save the equivalent of more than one train daily by the introduction of certain improvements combined with the use of stored energy on a single grade. The improvements will cost probably not more than two or three times the saving in a single year brought about by their introduction and the use of the grades mentioned.

I have no doubt that many managers who do not believe in the use of momentum grades have on their lines short grades that are every day climbed largely by the use of stored energy. I know of at least one such case. Feeling sure of my position in this matter, I have been greatly encouraged by the paper of Mr. Vaughan and the discussion on it, for it gives evidence that at least two lines among the well managed of the country are not only believers in the use of momentum grades, but are daily loading their engines with loads proportioned for the use of such grades and are sending the trains through successfully with great saving in cost of operation.

I have always held that the full theoretic value of the energy stored in a train could not be utilized, mainly because on long grades it is impracticable to keep the engine so evenly and continuously up to its work as to permit the spreading of the velocity head uniformly over the entire grade. And, on the other hand, on very short grades it will be possible to use nearly the whole of the stored energy, always making allowance for the head necessary for an assumed minimum velocity at the summit.

It seems to me that the limits given by Mr. Vaughan and Mr. Ellis are expressed in the wrong kind of units. They give total heights that in their several judgments it is proper to "take a run for." For the reason already advanced, namely, the inability to keep the engine up to its work steadily for long stretches, it would seem more rational to find a limiting length of grade rather than a limiting height to be surmounted.

I doubt very much the wisdom of making such close figures on such long stretches of grade as are given by Mr. John Marston in your issue of last week. I believe that there is a limit of length of grade beyond which it is not practicable to count on stored energy, and I believe that within this limit there is just as much certainty in the movement of trains properly proportioned for an expected use of such energy at some one or more points on the division as there is now with the engines supposedly loaded with what they can start from rest on the steep grades. Such grades must, of course, be selected judiciously, and the approaching track must be such as to make it morally certain that the desired velocity can be had.

I would not usually—unless it seemed very necessary—advocate the use of momentum grades on new location; but where an old line is found having at some one point a governing condition that by a little "fixing" and the use of stored energy, that can certainly be obtained, will permit the daily trains to be reduced by an appreciable number, the saving from which reduction would far exceed—not just equal or exceed—the cost of the work, it seems certainly wise to do the fixing and use the energy. To the road having 100 trains daily it means approximately ten times as much as to the road running but 10 trains.

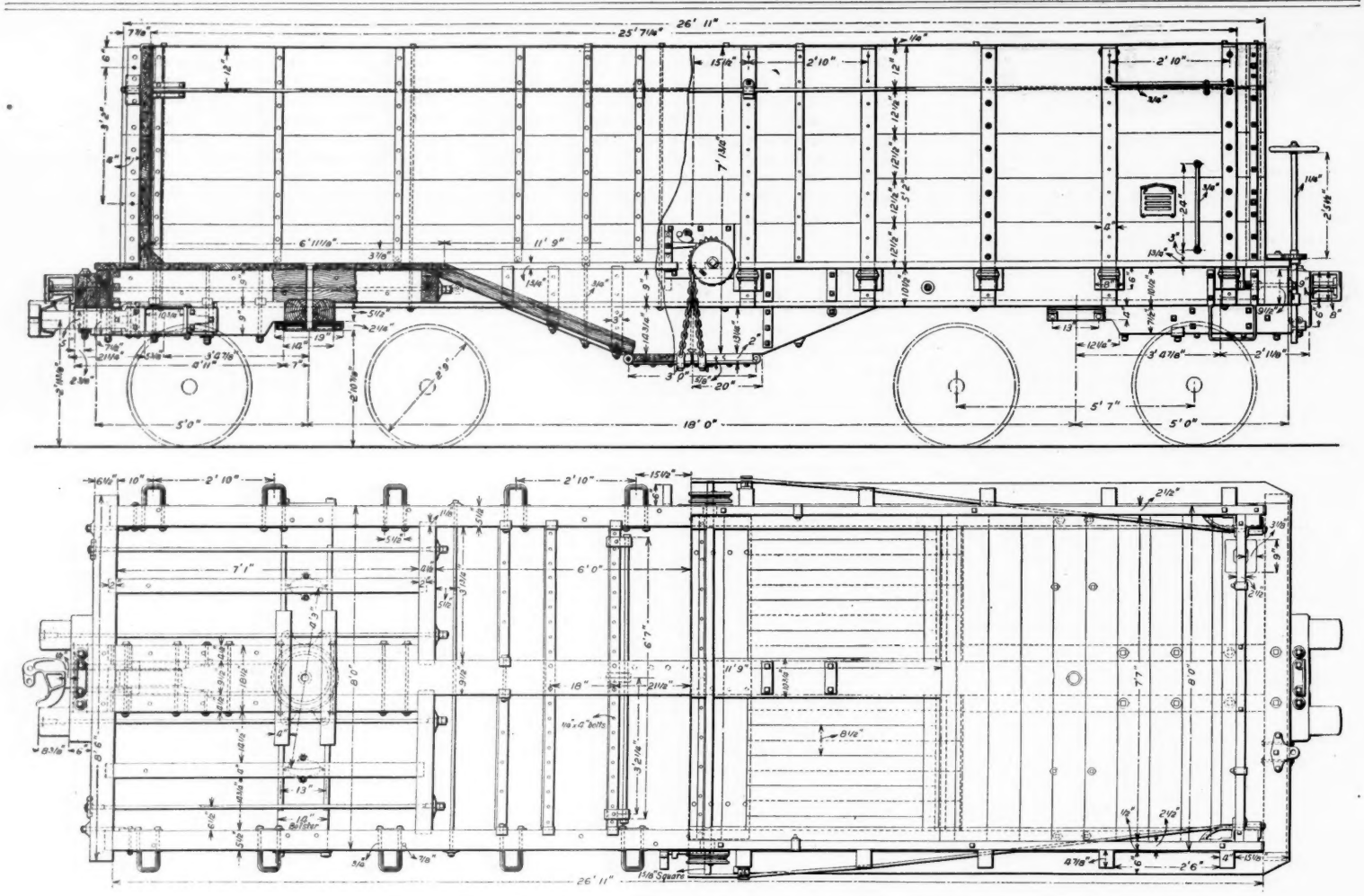


Fig. 1.—Elevation and Plan of 60,000-lb. Coal Car for the Southern Railway.

The study of caboose speed indicator diagrams beside the profile of the track on which they are taken is certainly a very interesting one, and it seems to me of great practical value.

We now have record of the fact that two roads are using momentum grades. Can we hear from the other side of any that have tried them properly and found them wanting?

WM. G. RAYMOND.

Judge Harlan's Opinion in the Texas & Pacific Case.

The dissenting opinion of Justice Harlan in the Texas & Pacific case has come to hand since the report of the decision of the Supreme Court was published in our last issue. Justice Harlan thinks that Congress did not intend that rates over interstate railroads should depend upon or be affected by "rates established abroad for ocean transportation." He says if the Texas & Pacific may charge such discriminating rates as those complained of, all other roads may and will do the same, "and if such discrimination by American railways, having arrangements with foreign companies, against goods, the product of American skill, enterprise and labor, is consistent with the act of Congress, then the title of that act should have been one to regulate commerce to the injury of American interests and for the benefit of foreign manufacturers and dealers." To support this argument he cites the rates in the case in question. Clothing, etc., coming from Liverpool, $1.07; same from New Orleans "carried, it may be, on the same train," $2.88. Boots and shoes, confectionery, woollen goods and various other things, from Liverpool, $1.07 same from New Orleans, $3.70. Mr. Harlan is "unwilling to impute to Congress the purpose to permit a railroad, for its own benefit," to thus charge three or four times more for domestic than for foreign goods. He lays stress on the phrase "like and contemporaneous service" in the law, and deduces from his consideration of the phrase and the context that when goods are to be carried from one point in the United States to another the rate cannot properly be affected by an inquiry as to where such goods originated. He quotes approvingly the opinion of the Interstate Commerce Commission (written by Mr. Bragg) that a paramount purpose of the law was to give all shippers the same rates for similar services rendered. Any other interpretation of the law puts it in the power of the railroads to do the grossest injustice to American interests. "I find it impossible to believe that Congress intended that freight originating in Europe or Asia and transported by an American railway from an American port to another part of the United States, could be given advantages in the matter of rates for services performed

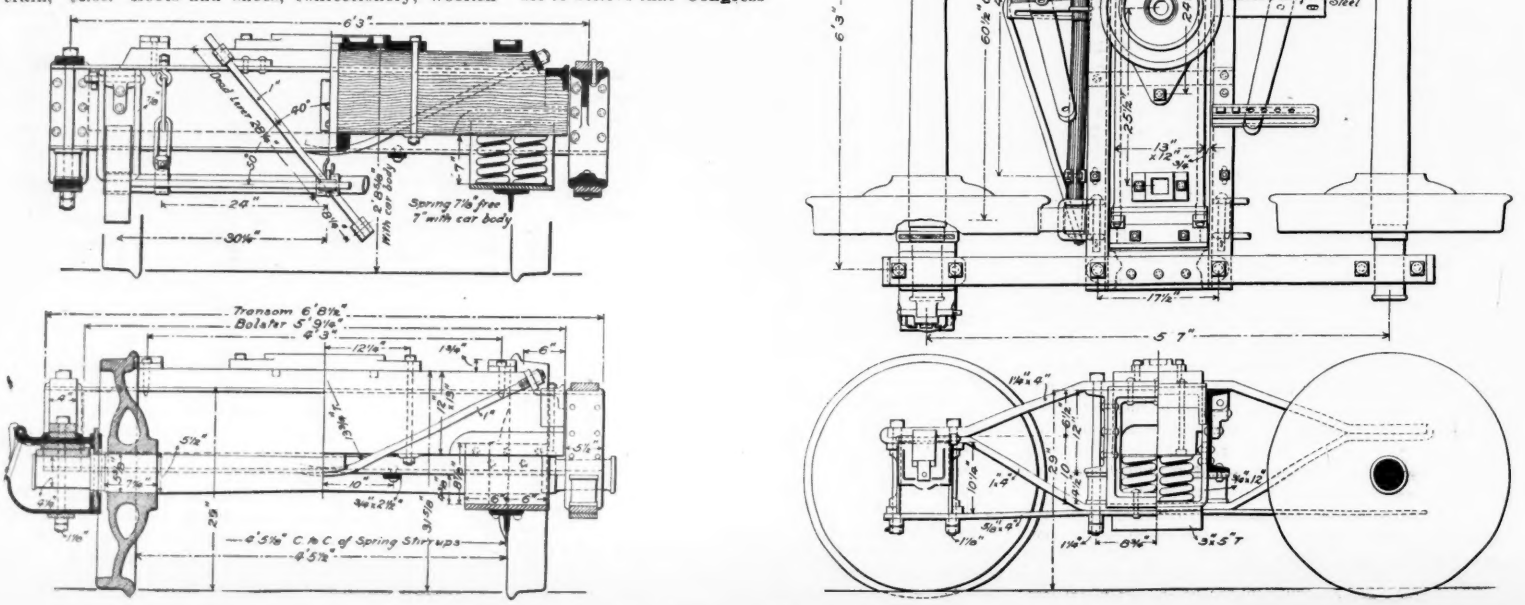


Fig. 4.—Details of Truck, Southern Railway Coal Car

in this country, which are denied to like freight originating in this country and passing over the same line of railroad between the same points. To say that Congress so intended is to say that its purpose was to subordinate American interests to the interests of foreign countries and foreign corporations." Judge Harlan says he is not much impressed by the anxiety of the road for the interests of the consumers in San Francisco. They have no concern whether the goods come by way of New Orleans or around Cape Horn. Are the interests of the New York shippers not entitled to as much consideration as those of the railroad corporations? "Are they to be subordinated to the necessities or greed of railroad corporations?" Continuing, he says:

"The act of Congress prescribes a rule which precludes the Commission or the courts from taking into consideration any facts outside of the inquiry whether the carrier, for like and cotemporaneous services, performed in this country under substantially similar circumstances and conditions, may charge one shipper more or less than he charges another shipper of like goods, over the same route, and between the same points. Undoubtedly, the carrier is entitled to reasonable compensation for the service it performs. But the necessity that a named carrier shall secure a particular kind of business is not a sufficient reason for permitting it to discriminate unjustly against American shippers, by denying to them advantages granted to foreign shippers. Congress has not legislated upon such a theory.

"Does any one suppose that, if the Interstate Commerce Bill, as originally presented, had declared, in express terms, that an American railroad company might charge more for the transportation of American freight, between two given places in this country, than it charged for foreign freight, between the same points, that a single legislator would have sanctioned it by his vote? Does any one suppose that an American President would have approved such legislation? If not, we should not declare that Congress ever intended to produce such a result; especially, when the act it has passed does not absolutely require it to be so interpreted. Under existing legislation, such an interpretation of the act of Congress enables the great railroad corporations of this country to place American travelers, in their own country, as well as American interests of incalculable value, at the mercy of foreign capital and foreign combinations—a result never contemplated by the legislative branch of the government. I cannot accept this view, and, therefore, dissent from the opinion and judgment of the court."

Judge Brown concurs in this opinion. Chief Justice Fuller writes a short paragraph holding that the second and third sections of the law are rigid rules of action for the Commission. Competitive conditions arising wholly outside the field occupied by the carrier cannot be taken into consideration.

60,000-Lb. Coal Car, Southern Railway.

We illustrate herewith a 60,000-lb. coal car, which has been used for some time on the Southern Railway, giving good results. The car is equipped with air-brakes, M. C. B. couplers and all other recent improvements in car construction. The cuts show the details and dimensions very plainly, and as we have already described this year a number of freight and coal cars (see the *Railroad Gazette* for Jan. 24, Feb. 28, March 6, March 13 and March 20) it is not necessary in this case to give more than the general dimensions, which are as follows:

Dimensions of Car.

Length of framing over sills	28 ft. 0 in.
Width	8 ft. 6 in.
Length of box in clear	25 ft. 7¼ in.
Width of box in clear	7 ft. 7 in.
Height of box above floor	5 ft. 0¼ in.
Center of drawhead above rail	2 ft. 11⅜ in.
Weight of finished car, about	29,000 lbs.

Dimensions of Trucks.

Center to center of wheels	5 f . 7 in.
" " " " journals	6 ft. 3 in.
" " " " side-bearings	4 ft. 3 in.
" " " " brake-shoes	5 ft. 0½ in.
Distance between wheel flanges	4 ft. 5½ in.
Mean height from top of track to bearing surface of center-plate, with empty car body	2 ft. 8⅜ in.
Diameter of wheels	33 in.
Weight "	600 lbs.
Journals	4¼ in. × 8 in.

12-in. channels riveted together with 12-in. × ¾-in. spring stirrup, and to Webb castings. Malleable, iron, M. C. B. wedge.

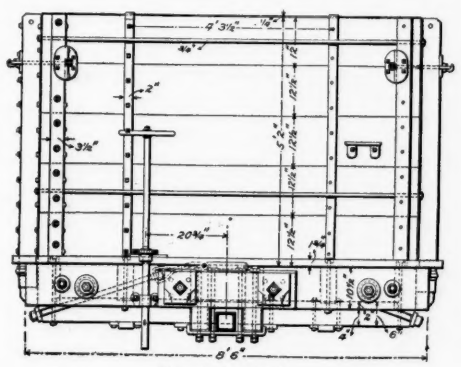


Fig. 2.—End View.

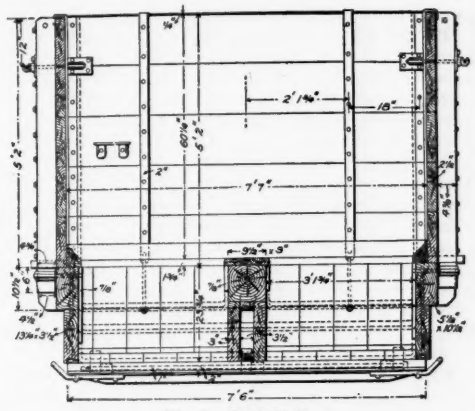


Fig. 3.—End Section.

Southern Railway Coal Car.

The World-Wide Field for American Railroad Men.*

Ten years ago, in this very city of Cincinnati, the American Railway Association was formed by the consolidation of the General Time Convention with the Southern Railway Time Convention. In looking backward over this decade, what justification do we find for the existence of this Association? To what extent has it fulfilled its object—"the development and solution of problems connected with railroad management in the mutual interest of the railroad companies of America"? Had it accomplished nothing else than the general adoption of standard time, or the preparation of the Standard Code of Train Rules, or the adoption of the interchangeable type of automatic freight car coupler, or of the standard height of freight car drawbar, or of the uniform location of handhold and grabirons, or the general recognition of car service associations, the development and solution of either one of these problems, all of which are due to this association, would in itself have justified its existence. But the work which in the past it has accomplished is but an earnest of its possible usefulness in the future. It is available as the means of communication between the American railway system as a whole and the American people as a whole. The association rendered valuable service in the Congressional legislation which resulted in the Safety Appliance act. Representatives of the association appeared before the Congressional committee, and the members of this committee recognized that these men were thoughtful and well informed, experienced in the matter of which they spoke, and earnest in their desire to bring about a reform in the general use of railway appliances; that they represented no cliques, no combinations; that they were influenced by no unworthy motives, but that they represented the American railway system as a whole, and were able and willing to indicate the proper solution of a problem beset with many difficulties. And to-day you will find in the Railway Safety Appliance act that to the American Railway Association has been given the authority to designate the technical details contained in that act, which is now the law of the land.

The way has thus been provided for determining similar details for future legislation, for where can be found a body of men better equipped to determine them, or whose conclusions would be more readily accepted by the American people as embodying the most modern railway practice? And recently the way has been opened to even a broader field of usefulness for the American Railway Association, the International Railway Congress. Over forty American delegates attended the London Congress in 1895. It is true that this was but a small minority of the 750 delegates present, but the effect produced by their appearance on this occasion was out of all proportion to their numbers. The very fact that they represented a greater railway mileage than all the other railway delegates particularly emphasized the presence and the importance of the American delegation. . . .

And the Congress suggests another field of usefulness for the American Railway Association—the introduction of American railway methods of construction and equipment and operation on that tripartite continent of which Europe is the smallest member. Of that continent of 33 million square miles Europe constitutes but one-ninth in area, and yet Europe is larger than the United States. Of the total railway mileage of the world nearly one-half is in this country and most of the other half is in Europe. It is to the other great members of the transatlantic continent—it is to Asia and Africa—that I would draw your attention, with their area of nearly thirty million square miles and their population of 1,000 million human beings. Is this great field for railroad construction and management to be disregarded by those who are wont to boast of American energy and enterprise? Are we to remain contented with the restricted possibilities for American railway men and for American manufacturers of railway material in the maintenance and operation of roads within our own national boundaries? We are approaching gradually to the conditions which prevail in Europe, where there are more men and larger productive plants than can be profitably employed at home, and we must look abroad for their employment. But it would be a waste of time to seek for opportunities in Europe. European methods have been firmly founded on British practice; our railroad men would there be out of place, whether as constructing engineers, as locomotive runners, conductors, brakemen or switchmen, and our manufacturers of rails, equipment and appliances as well. Indeed, Great Britain and the western European states themselves now look abroad for profitable employment for their men, their manufacturers and their surplus capital. Great Britain has found her field in her own colonies. France has hers in Africa, in Algeria and Senegal. Belgium has established hers in equatorial Africa, and the Germans, just now outgrowing in productiveness their own needs, are eagerly watching and imitating their British kinfolks. Austria-Hungary, with half our population, is stretching her rails and her trade down the Danube and into the Balkan Peninsula.

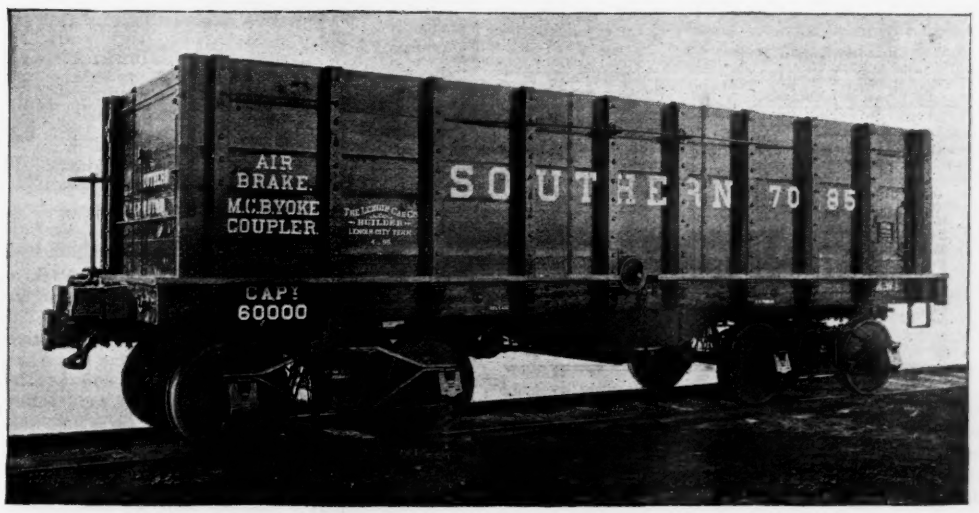
In considering this general advance of European countries all along the stragetic line of this campaign for African and Asiatic trade, we may well ask, what will be left for the United States? On the north of us is Canada, British by sentiment, and but partly American in railroad practice. To the south of us is Mexico, where we have some advantage over European methods and appliances; some little opportunity in Cuba and Jamaica, and more perhaps in Central America. Then comes South America, with nearly twice our area and half our population. This is our sphere of action, or, at least, that which will be left to us if we close our eyes to what is going on elsewhere on the globe. If we wait until 50 miles is built from one African seaport and 20 from another into the heart of that continent, all under the British system, we may say farewell for employment thereafter for any American men in those regions, or for the sale of railway appliances of American make. If French or Belgian or German engineers lay out a railroad line anywhere on the habitable globe, the French or Belgian or German appliances follow, as surely as the thread follows the needle. There is Russia, with twice our area and nearly double our population, just inaugurating a transcontinental railway. That great empire was represented at the London Congress by a delegation of intelligent, experienced men, eagerly seeking for information. The Japanese representatives, too, were special inquirers as to American methods.

American methods are best suited for opening up routes on which the traffic has yet to be created. Whatever is best in European practice is best adapted to routes which are intended to furnish facilities for existing traffic. . . . It is not our first-class roads that the projectors in those untried fields can study to advantage. It is the cheap road, the cheap methods of operation that their interests require and of which they are ignorant. When the American delegates spoke, at the London Congress, of handling 50 or 100 trains a day, and 30,000 or 40,000 cars a month, over a single track, the statements were evidently received as specimens of American brag.

Now, what opportunity is there for American methods and appliances getting even a foothold in lands where European influences prevail? Evidently but little, so long as European ignorance prevails as to American methods and appliances, and it is just here that the value of the American Railway Association comes in; that is, in pointing out the way for penetrating this ignorance, for dispersing the clouds of prejudice and the fog of indifference which obscure the minds of those European engineers who control the purse strings of the European capitalists that are to provide the means for constructing the untold thousands and tens of thousands of miles of railroad yet to be built in Asia and Africa and elsewhere outside of the present limits of American influence. But we must teach by example. Instead of addressing the seven or eight hundred railway engineers and managers that make up the International Congress, in a land where there is not one example of American practice, let us induce that great body of men, foremost in railway reputation and experience throughout the world, to come and listen to us here, where every word that we speak will be multiplied in effect one-thousand-fold by what they will find all around them. It is a case in which a great result is to be sought, one of momentous importance to the future welfare of our people, and the effort to accomplish this result must be correspondingly great. Desultory, isolated attempts will fail. Our energies must be concentrated to be effective, and the most effective way to concentrate them can only be afforded by the American Railway Association.

The next meeting of the International Railway Congress is to be four years hence in Paris, at the time of the Exposition, and from what I learned unofficially at the London meeting, I believe that if a proper effort be made on that occasion the succeeding meeting can be held in the United States; but if such an effort is to be made, then no time should be lost in preparing to make it, for there is much to be done if we are to offer such hospitality as was accorded to the Congress last year in Great Britain.

In closing, Colonel Haines referred to the termination of his nine years' presidency (his retirement from the service of a railroad company makes him ineligible for re-election), and gracefully thanked the members for their appreciation of his services. He enjoined a strict



60,000-lb. Coal Car, Southern Railway Company.

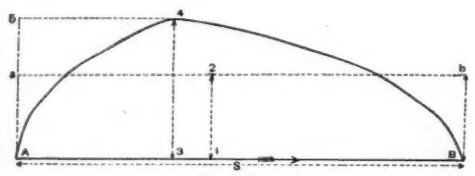
* Address of Col. H. S. Haines, President of the American Railway Association, at Cincinnati, April 15; condensed.

adherence, in the future activities of the Association, to the principles that have hitherto guided it. It will be an evil day when the "mutual interest of the railroad companies of America" shall be disregarded, or when the action of this body shall be considered as anything more than "recommendatory in its character." Your proceedings have heretofore been harmonious in their results, and so they may be expected to continue, so long as you discuss nothing but practical matters, so long as you strictly keep away from matters involving questions of revenue to your members.

But, however careful you should be to remember that the action of this Association is only recommendatory in its character, do not be unmindful of what that action represents. It represents the convictions of the foremost railroad officials of this country, as to the best methods of American railway practice; convictions reached with such opportunities for gathering information as no single one of you possesses. . . .

A Rapid Transit Problem.

Given two stations *A* and *B*, on a level, straight railroad track, separated by a space *S*—required, in what time a train starting at *A* and stopping at *B*, may traverse this space.



In the diagram, *A* and *B* are the stations; the space between them is *S*; and *A* 4 *B* are curves indicating the speed between these stations, *A* 4 the acceleration from *A* the starting point and 4 *B* the retardation to the stopping point; hence the normal 3, 4, from the intersection of these curves 4, to the base *S*, represents the maximum speed attained. Also the area of the parallelogram Aa, bB, equal to the area enclosed by the two curves and the base *S*, divided by the base *S*, namely 1, 2, represents the mean speed attained.

It will be noticed that the retardation curve is practically constant—its elements being determined by the conditions of stopping a train, safely and without inconvenience to passengers; the acceleration curve, if similar conditions are disregarded, may range from *A B*, representing no speed, to A^5, representing infinite speed. Should the latter be possible—that is, the train at starting, immediately move at maximum speed—the increase of mean speed between the two stations, over that represented by 1, 2, in the diagram, would only be that represented by area $A4, 5, a$, divided by the space *S*—quite small as compared with area $Aa\ bB$ divided by the same space.

Simple formulæ indicate the trend of these two curves—acceleration and retardation, and consequently the maximum and mean speeds possible—the constants in each formulæ being determined by the operation of trains, subject to conditions similar to those under consideration.

As perhaps is reasonable—and surely tending to the reduction of time of transit—it has been assumed that the acceleration of speed may be thrice the retardation; that is, a train leaving a station may acquire maximum speed in one-third the space between that station and the one at which it is to stop. Also it is assumed that the trains shall stop one minute at each station.

From the formulæ and subject to the conditions mentioned, the following table has been computed, showing the spaces required between stations, that trains may be moved at the speeds indicated:

Speed—Miles per Hour.			Between Stations.	
Mean.				
Over the entire line.	Between Stations.	Maximum.	Space—Miles.	Time.
5	12.2	18.2	0.14	1′ 42″
10	19.1	28.6	0.35	2′ 6″
15	25.3	38.	0 61	2′ 27″
20	31.2	46.7	0 93	2′ 48″
25	36.8	55.2	1.3	3′ 7″
30	42.3	63.5	1.72	3′ 26″
35	47.7	71.6	2 18	3′ 44″
40	53.1	79 6	2.7	4′ 3″
45	58.4	87.6	3.27	4′ 22″
50	63.7	95.5	3.89	4′ 40″
55	68.9	103.3	4.55	4′ 58″
60	74.	111.1	5.26	5′ 16″

From this it appears that, for a mean speed over the entire line of 15 miles per hour, the maximum speed between stations shall be 38 miles, and these stations shall be nearly five-eighths of a mile apart; that for a mean speed of 30 miles the maximum speed shall be 63½ miles and these stations shall be nearly 1¾ miles apart, and that for a mean speed of 45 miles the maximum speed shall be nearly 88 miles and the stations shall be over 3¼ miles apart.

G. LEVERICH.

BROOKLYN, N. Y., April 8, 1896.

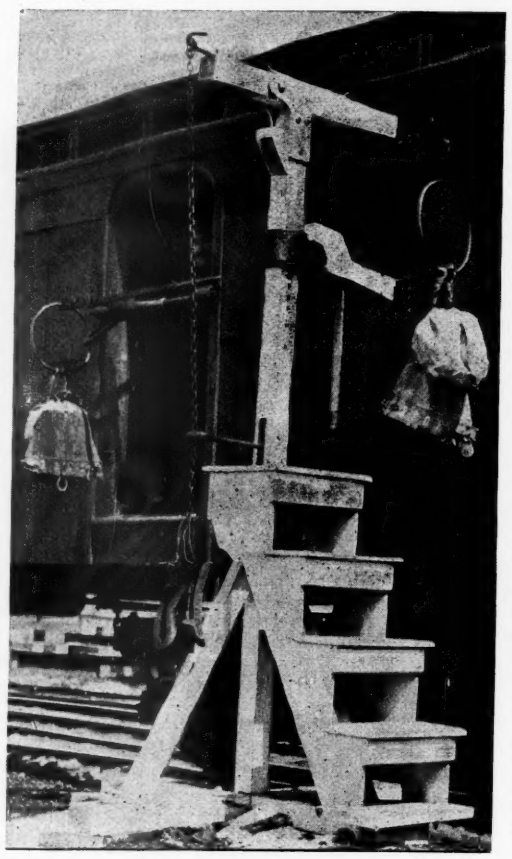
The Philadelphia & Reading Railroad Subway and Tunnel in Philadelphia.

On March 17, 1894, the Councils of Philadelphia city enacted an ordinance to authorize the works necessary to abolish all grade crossings on the line of Pennsylvania avenue and Noble street, between the east side of Thirteenth street and Poplar street. This work involves the depression of the tracks and yards of the Philadelphia & Reading Railroad Company, between Broad street and Thirteenth street, including the alterations of the lines and grades of the tracks of the Philadelphia & Reading Terminal Railroad east of Broad street and between Noble and Carlton streets. This necessitates in addition the alteration, construction and reconstruction of all the yard tracks, freight, engine, depot and signal buildings and other structures of the Philadelphia & Reading so as to provide as much accommodation and as full and convenient a method for operation and conducting business as now exists. Adequate track connections with the various industrial establishments along the line of the Philadelphia & Reading are to be provided; provision is made for the construction of temporary tracks and bridges for maintaining travel on the railroad and upon all of the intersecting streets.

Bridges with adequate approaches, abutments and piers, are to be built to carry Broad street, Fifteenth street, Sixteenth street, Seventeenth street, Eighteenth street, Nineteenth street, Twentieth street and Twenty-first street over the tracks of the railroad. Bridges at Callohill street, Twelfth street and Thirteenth street are to be built to carry the tracks of the Philadelphia & Reading and the Philadelphia & Reading Terminal Railroad over these streets. Provision is made for carrying the tracks of the Philadelphia & Reading Railroad by open subway, with the necessary retaining walls and the underpining of all structures along the line, from a point near Broad street to Hamilton street between Twenty-first and Twenty-second streets; by tunnel from Hamilton to a point near Taney; and thence by open subway to Thirtieth street.

This will require the construction of 1,060 linear feet of elevated structure, 6,028 linear feet of open subway, and 2,912 of tunnel. The open subway has width sufficient to accommodate from four to six tracks. This subway will be at an average depth of about 25 ft. below the grade of the present tracks.

Pennsylvania avenue, from Hamilton to Taney street, over the tunnel is to be widened to 120 ft. and paved,



The Fleming Mail Catcher and Deliverer.

thus affording a magnificent entrance to the Park, and the entire avoidance of danger and annoyance of from passing trains.

An entire reconstruction of the sewer system, between Twelfth street and Thirteenth street, was necessitated and was completed during the past year; and the alteration and reconstruction of gas and water mains, electrical conduits and other municipal structures in Twelfth street, Thirteenth street, Broad street and a few of the other intercepting streets will require more or less changes of grade and the consequent repaving.

The Philadelphia & Reading Railroad Company is to release to the City of Philadelphia any and all right and title which it may have to maintain railroad tracks upon the surface of that part of Pennsylvania avenue occupied by the tunnel between Hamilton street and Taney street.

The completion of this work will abolish 17 grade crossings on important thoroughfares. The ordinance provides that work should be commenced immediately and prosecuted vigorously without delay or interruption.

The estimated cost of the whole of this work, including damages to property, approximates $6,000,000, of which the Philadelphia & Reading Railroad Company is to pay one-half. By ordinance of March 15, 1894, a loan of $6,000,000 was authorized, and on July 15, 1894, $600,000 of this amount became available. Work was immediately begun upon the general plan for the depression of tracks, industrial connections, etc., and upon the general and detail plans for the sewers.

The general plans were prepared by the Bureau of Surveys and on Aug. 31, 1894 they were approved by the officials of the City of Philadelphia and the Philadelphia and Reading Railroad Company.

The Bureau of Surveys made in all more than 600 plans and all but about 200 have been discarded for various reasons. These latter with specifications are now on exhibition in the City Hall in Philadelphia for the inspection of contractors, bids are asked for the completion of the subway and tunnel, and are to be opened on May 12. They cover 21 contracts numbered from 11 to 31. Contracts from 1 to 10 were for sewers which have been constructed.

WALTER ATLEE.

PHILADELPHIA, Pa., April 13.

The Fleming Mail Catcher and Deliverer.

The engravings which appear with this article show a mail catcher and deliverer recently patented by Mr. H. N. Fleming, of Erie, Pa., and which has been in daily service on the Erie & Pittsburgh for over a year. The line drawings show the construction of the apparatus, and from the perspective a clear idea of its operation may be obtained. The ring, to which the pouch is attached, holds the upper and the lower arms together. The catcher arm on the car passes midway between these arms taking the ring and pouch with it, and the lower arm passes through the ring hanging from the car and takes it off. This arm drops and swings around away from the car and thus absorbs the momentum of the bag detached from the moving car, so that there is no danger that it will throw the bag around against the car. It is stopped by striking against the weighted chain. On double track, only one half of the upper arm is used.

This device is one of the four recently approved by the Post Office Department, and it is the first one on the list. Thorough tests were made by a committee appointed by the Postmaster-General last January, and as a result the General Superintendent of the Railway Mail Service has issued a circular to railroads calling their attention to the unsatisfactory features of the cranes now in use. He requests railroads to adopt one of the approved devices whenever renewals are necessary.

The manufacturers, the Fleming Mail Catcher & Deliverer Company, of Erie, Pa., in a circular recently issued to railroad officers, call attention to the fact that the outer edge of the ring in this apparatus is hung on the crane farther from the car than is the case with the devices now in use. With the latter a pouch is occasionally knocked off the crane by a passing car. With the Fleming apparatus pouches never have to be thrown or kicked off the car, and the delivered mail is positively and securely hung on the lower arm of the crane. The extended arm of the catcher on the car projects only 15 inches. The clerk on the car, being relieved of the necessity of watching for a suitable place to throw off the bags, wastes less time. There is no wear and tear on the bags, the whole weight being moved as a part of the steel ring.

This apparatus will fit any car, and cranes now in use can be made suitable for it at a cost of $2. The Fleming apparatus can be applied to cranes between the tracks and to swing cranes. No rings or straps are required in the center of the bag. In fact, the apparatus will handle any pouch, sack or basket, and the weight is practically unlimited.

The manufacturers also suggest that railroads could use this apparatus with profit in delivering daily newspapers at country stations. In speaking of accidents they say that the Supreme Court of New Jersey affirmed a verdict against the Pennsylvania of $12,120 last year for the death of a man killed by a mail bag at Rahway. On the Southern Railway, on March 26 last, a passenger train was derailed, and four persons were injured, by the misplacement of a switch, which was caused by a mail bag thrown out of the mail car. The circular gives the names of officers of the Pennsylvania lines as references. The records show that this crane has never missed receiving a pouch.

The Air-Brake Men's Association.

The third annual convention of the Railroad Air-Brake Men's Association opened at the American Hotel, in Boston, Mass., Tuesday morning, President S. B. Hutchins in the chair, and 79 members present.

An address of welcome was delivered by Professor Swain, of the Massachusetts Institute of Technology, who emphasized the importance of careful air-brake work, and called attention to the rapid progress made within the past few years in the application of brakes to all classes of service, passenger and freight cars and locomotives.

The President's address, which followed, enlarged upon the same idea, and in it it was stated that 1,400 sets of engine and tender brakes and 74,000 sets of freight-car brakes had been sold during the past year, thus making the present equipment 29,000 locomotives and 388,500 freight cars, of which 335,000 are of the quick-action type. The President strongly recommended the use of slack adjusters, yard testing plants and instruction cars. He congratulated the Association upon its rapid growth, the membership now numbering 221, and the hearty reception given to its annual reports, as evidenced by the fact that the whole of the last edition of 2,000 copies had been sold.

The reading of the Secretary's report was followed by the presentation of a few letters and the acceptance by the Association of an invitation from the New York New Haven & Hartford for an excursion to Plymouth on Wednesday.

The first of the regular papers to be read was that on Piston Travel, which is published in this issue.

The discussion of this paper was opened by Mr. Farmer, the Chairman of the Committee, who offered an explanation of one of the statements made. He said that the lost travel due to the movement of the journals under worn brasses would not be as great as shown by the report, and that this discrepancy is explained by the fact that at the time of making the test the Committee supposed that they were working with old brasses, and only became aware that they had not been after the report had been sent to the printer. The brasses were new, and the actual lost travel would probably be decreased by the lessened longitudinal travel of the journal under these brasses after they had become worn.

The main discussion of the paper centered in the recommendation of the committee that "yard tests be made at 90 lbs. train pipe pressure and a full service application, and piston adjustments, based on this, be made 5½ in. for freight and 7 in. for passenger."

The objections raised were, that it did not seem worth while to go to the extra trouble and expense to secure an air pressure of 90 lbs., when only 70 lbs. was used in service; and also that if we knew just how the results obtained with 70 lbs., in the yard compared with 70 lbs. in service, the 90 lbs. test was superfluous.

But the sentiment of the meeting was decidedly in favor of the 90-lb. test. Mr. Hawkes announced that for 20 years the Chicago & Alton had been making yard tests with from 90 to 95 lbs. pressure; and that there was too much variation in the action of different cars to trust to any allowances, especially where, as in the case of the C. & A. 14, 10 and 8-in. cylinders are used in passenger service. The real reason for using this higher pressure lay in the fact that the piston travel in service is greater than upon a standing car and that 90 lbs. in the latter condition will produce about the same travel as 70 lbs. in the former.

Mr. Alexander said that on the Pennsylvania they were testing at 100 lbs. two years ago, and were setting the piston travel at from 5 in. to 5½ in., but by keeping a record of this travel they found that, with the strong brake rigging used, there were many slid-flat wheels at 70 lbs., and that now the piston travel is set at 7 in. at Altoona.

Another member stated that he was using 80 lbs. very satisfactorily and adjusting the travel to 4½ in. At first the committee thought that a 90-lb. pressure was an extravagantdemand and impossible to secure, but it was thought best to recommend it, in that it was only called for in terminal plants, where it could readily be provided for at the time of connection. Besides it could be obtained either by taking two pumps and compounding or by bushing the air-cylinder and by using a reservoir of ample size.

Regarding the inspection of piston travel at terminals, it is customary, according to Mr. Alexander, to stop with the brake applied at division terminals and allow the new engine to make the release, thus occupying not more than three minutes to change the engines. Then, if a piston shows too much travel, the car is carded to that effect. Two years ago the travel was limited to from 5 in. to 9 in., but from carelessness and the liberties taken by the men the actual variation ranged from 3 in. to 12 in. It was then made from 6 in. to 8 in., so that now the extreme variation runs at about the old limits. But at extreme terminals, as at Pittsburgh and Philadelphia, the travel is fixed at 7 in. and liberties are not allowed or taken.

An objection was made to this method of stopping with the brake held on, on the ground that such a practice would not give a fair indication of the actual travel. In making a stop the engineer must necessarily be governed by circumstances over which he has no control, and may be compelled to make several applications, and some brakes may even be kicked off, so that the position of the pistons at the stop may not at all agree with their condition after a fresh application from a full 70-lb. pressure. Then, too, care must be taken that the indicated travel is not the result of setting up the hand-brake.

Brakebeams were touched upon, and while the general sentiment was decidedly in favor of the metallic beams, the trussed beams of hickory or oak were shown to be very satisfactory if properly constructed. The application of the 90 lbs. pressure to the light leverage was asserted to have had no detrimental effect.

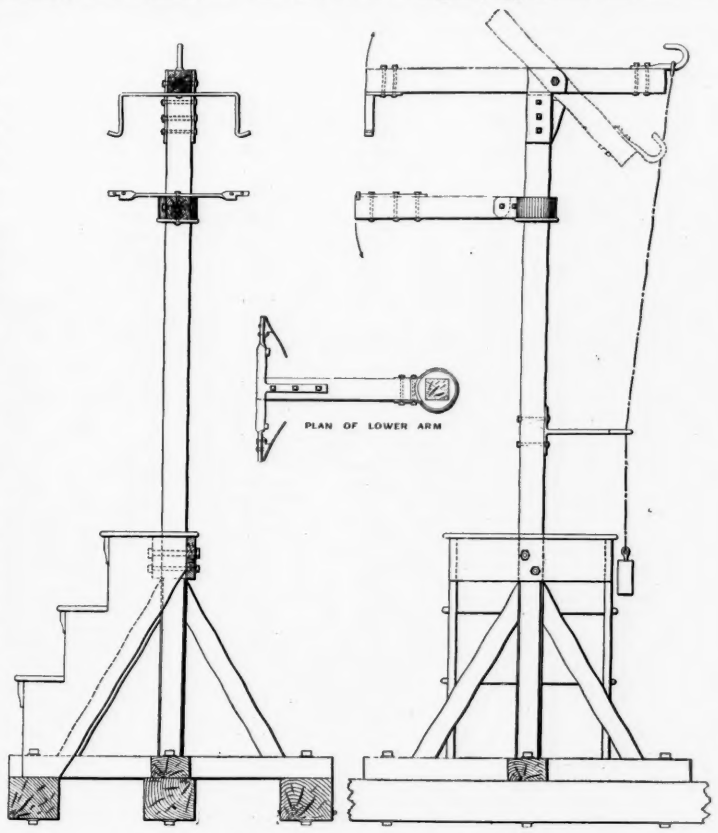
With reference to the fine adjustment of 4½ or 5 in. of travel, it was suggested that this was coming very close to covering the leakage groove.

At the close of the discussion the report was accepted.

The second report read on Tuesday was that on "Slack Adjusters." An abstract of this and of the discussion will be published next week.

The third report was that on "Progressive Questions and Answers on the Air Brake." It was very long, was read in abstract only, and was referred back to the committee to be presented for discussion at the session of Wednesday morning, after which the morning meeting was adjourned.

On Tuesday afternoon the members visited the office of the Automatic Track Sanding Co. to inspect the Sherburne apparatus for automatically sanding the rail on the application of the air-brake. It consists of a blower in the sandbox, and the connection to the engineer's valve is made by means of a small auxiliary reservoir and a triple valve. When the brake is applied the triple discharges the air from the auxiliary into the sand blower. This always occurs upon the emergency application, and on the service also unless a special provision is made to prevent it. This provision consists of a direct connection from the auxiliary reservoir to the train pipe, and in it there is a valve with a leakage sufficient to equalize the pressure in the train pipe and reservoir and thus prevent the triple from acting, while in the case of an emergency application this leak is not large enough to do that work, and the triple moves, admitting the air to the blower as before.



The Fleming Mail Catcher and Deliverer.

Later in the afternoon the members visited the interlocking switch and signal tower of the Boston & Maine Railroad, and in the evening attended the meeting of the New England Railroad Club.

The Semi-Centennial Anniversary of the Pennsylvania.

The fiftieth anniversary of the incorporation of the Pennsylvania Railroad was celebrated in an elaborate manner at Philadelphia on Monday of this week with the completeness and success so characteristic of the company in all its undertakings. At noon a reception was arranged for the operating officers of the company by President Roberts and the Board of Directors, in the general office, 300 invitations having been issued for this event. An hour later a general reception was held at the same place by the President and Directors, which was attended by more than 800 persons.

The most important feature in connection with the celebration was the exercises at the Academy of Music in the afternoon. The auditorium was filled with stockholders and other guests, and upon the stage were seated President Roberts and the Directors of the roads composing the Pennsylvania system, the Justices of the Supreme Court of Pennsylvania, Governor Hastings, the Judges of the United States Court in Philadelphia, and of the several local courts; Mayor Warwick, of Philadelphia; Vice-President Brooks, of the Pennsylvania Company; Joseph H. Choate, of New York; Frederick Fraley, the venerable President of the Philadelphia Board of Trade, and many others, including John Bindley, President of the Pittsburgh Chamber of Commerce; John D. Archibald, of the Standard Oil Company, of New York; S. W. Allerton, of Chicago; George E Bartol, President of the Philadelphia Bourse; Oliver W. Barnes, of New York; Dumont Clark, President of the American Exchange National Bank, New York; Andrew Carnegie, Ex-Senator George F. Edmunds, President Harris and Vice-President Voorhees, of the Philadelphia & Reading; Vice-President Hartshorn, of the Lehigh Valley; Benjamin G. Godfrey (one of the incorporators of the Pennsylvania, who still holds his original certificate of stock); Morris K. Jessup, of New York; F. J Kimball, President of the Norfolk & Western; T. B. Kennedy, President of the Cumberland Valley road Samuel Sloan, President of the Delaware, Lackawanna & Western; Robert F. Stockton, President of the United New Jersey Railroad & Canal Co.; W. L. Trenholm, President of the American Surety Co., New York; George C. Williams, President of the Chemical National Bank, New York, and Calvin Wells, President of the Pittsburgh Forge and Iron Works.

Addresses were made by President Roberts, Governor Hastings, Mayor Warwick, Frederick Fraley, Vice-President Brooks and Joseph H. Choate. In the evening a reception was held in the general offices of the company in honor of President Roberts.

President Roberts' address was of a historical character, and gave statistics showing the great growth in traffic and in property owned which has come to the company in its 50 years of existence. After acknowledging the loyalty of the 100,000 employees of the company, Mr. Roberts went on to speak of the organization of the company in 1846. In 1852 it had completed, in connection with the state works, a line of transportation between Philadelphia and Pittsburgh, of which 224 miles was railroad, with a capital and debt of 12 million dollars. In that year it carried 70 thousand tons of freight and about half a million passengers. The company's tonnage has grown to 160 million tons in 1895, and it carried in that year 75 million passengers. It owned in 1852 about 50 locomotives and not over 1,000 cars. To-day it controls 3,400 locomotives and 141,000 cars besides 226 barges and other water craft, an equipment which would give a train of cars extending from New York to beyond Chicago. The company now controls 9,000 miles of railroad, either by lease or ownership, and Mr. Roberts referred to the 357 miles of road from Philadelphia to Pittsburgh as the keystone of the system. The corporation has owned or controlled 256 companies, which by consolidation and merger are represented to-day by 138 distinct companies, most of them transportation companies, but some engaged in manufacturing and mining. The aggregate capital of these corporations is about 834 million dollars. The trackage controlled is equal to a line of rails around the earth and more.

The gross income of the corporation in 1852 was less than two million dollars; in 1895 it had grown to 133 millions, an income which can only be compared with the revenues of the national government.

The road's pay roll in 1852 was less than $400,000, and in 1895 it amounted to over 36 million dollars, an average of over $100,000 a day. These figures represent, of course, only a small part of the disbursements of the company they illustrate, President Roberts thought, how closely identified the prosperity of the company is with the prosperity of the individual. There is no record of the number of men employed in 1852, but in the past year 97,000 men were upon the pay rolls. Mr. Roberts said that the company had distributed to its shareholders in the last fifty years over 166 million dollars, a very fair rate of interest, as he noted, on every dollar that has been invested by the shareholders in the corporation from the first day to the present time.

He then spoke of the growth of the chief cities reached by the Pennsylvania, and in conclusion referred to the company's treatment of its employees, giving some account of the Employees' Relief Fund, organized some 10 years ago. It now numbers 52,000 members, and has distributed $6,000,000. It is now distributing a sum equal to $2,000 for each working day.

A Robust Car.

The strength of the new Chicago, Burlington & Quincy box cars, built by the Wells & French Co., and described in the *Railroad Gazette* of Jan. 24, 1896, was well shown a short time ago. One of these cars came to a Western foundry loaded with pig iron, and on weighing it the total amount of iron was found to be over 100,000 lbs. The frame of the car was not sagged in the least, although the load was almost double that for which the car was designed, namely, 60,000 lbs.

Air-Brake Piston Travel.

At the meeting of the Air-Brake Men's Association in Boston this week a report on Piston Travel was presented by a Committee consisting of Messrs. Farmer, Blackall, Carr, Fairchild, Gregory, Casey and Parker. This report we print below at considerable length, regretting that space has obliged us to cut out some portions. Even those are valuable for the complete study of the question, and we would advise the reader who is especially interested to get the full report. The discussion is given elsewhere.

What distance brake piston travel should be regulated at and the variation permissible before readjustment is an important question. . . . As increasing the travel decreases the pressure developed, and decreasing it has the reverse effect, being dependent on the space into which the auxiliary reservoir pressure expands, it will be apparent from the start that if the brake power designed to be had is correct, the travel developing it should not be materially varied from without a change in the leverage or train pipe pressure. Also, that any variation from this travel should be uniform on all. These two propositions are considered as undisputable. However, it is not in the maximum application of the brake that the greatest difference in cylinder pressure results from varying travels. The action of the brake in service application is such that, commencing with an equalized auxiliary reservoir and train-pipe pressure, any reduction in the latter is followed by an equal one in the former through expansion into the brake cylinder. Regardless of the number of brakes operating together, this is true up to the point of full application of any one or ones. Until this is reached it may be said that with each train pipe reduction practically the same amount of air is admitted to each cylinder, and the very considerable variation in pressure developed with varying travels is shown in Table No. 1. The committee, being able to find no such table that could be relied on, made careful tests at the St. P. & D. R. R. shops, employing a standard Westinghouse freight brake, the results being embodied in table. . . . A close observance of the work done by many good engineers indicates that with brakes in fair condition the average stops are made by such men with reductions of from 10 to 15 lbs. Also, that about the same amounts are required in holding down heavy grades at ordinary speeds. Referring to Table 1 it is seen that a 10-lb. reduction gives a cylinder pressure of 23½ lbs. with an 8-in. travel, and one of 43 lbs. with a 5-in. travel, an increase of nearly 50 per cent. Before treating this farther, we will consider the relative merits of a uniformly short vs. long travel.

UNIFORMLY SHORT VS. LONG TRAVEL—TABLE NO. 1.

Train pipe Reduction.	Piston Travel and Resultant Cylinder Pressure.							
	4	5	6	7	8	9	10	11
7	25	23	17⅛	13+	10⅛	8	Piston not entirely	out.
10	49	43	34	29	23½	19½	17	14
13	57	52	44	37½	33	29	24	20
16			54	47½	41½	35	29	24
19				51	47	40	36⅛	32
22					50	47½	44	39
25							47	45

Uniformly Short vs. Long Travel.—Whether the piston travel be long or short, uniform or varying, a certain total amount of retarding power must be developed to accomplish the same work one time and another, whether this be making a stop or holding on grade. Therefore, as Table No. 1 will show, a uniformly long travel means a greater amount of air consumed to produce a required cylinder pressure, and a lesser reserve left in the auxiliary reservoir. With frequent stops from high speeds, long trains and considerable leakage, the pumps, which were of ample capacity some years ago, are proving insufficient. Not only is it difficult for them to pump up and maintain the pressure, but the high speeds at which they must be run makes the interval between repairings disproportionate to the work performed. A partial remedy is to reduce the amount of air consumed in doing a given amount of work, and piston travel offers an excellent opportunity for accomplishing this.

The M. C. B. Association has placed the limits for freight cars in interchange traffic at "not less than 5 in. nor more than 9 in." While this is, properly, a limit only for the interchange of cars, several roads have adopted it as a local rule, and others use only the maximum limit of 9 in. To demonstrate the need for at least reducing the maximum limit, the following is given. Tests made with the freight brake showed that a 21-lb. reduction with a 9-in. travel gave 43 lbs. pressure, and that a 10-lb. reduction with a 5-in. travel gave the same cylinder pressure. On each car this should mean a saving of 390 cu. in. of air at 49 lbs. pressure. A very conservative estimate of the number of brake applications made on a through fast train over one of the Northwest Pacific Coast roads is 175, and this without considering switching or more than one application in making a stop. On a 30-car train the difference in amount of air used with two travels mentioned would amount to 2,047,500 cu. in. at 49 lbs. pressure; or 8,736,000 cu. in. of free air. A low estimate of the amount of steam at 140 lbs. pressure that would be consumed in compressing this amount of air to 90 lbs. pressure is 2,732 cu. ft. with an 8-in. pump. and 2,030 cu. ft. with a 9½-in. pump. An 8-in. pump in good condition and run at full speed with 140 lbs. boiler pressure would require about 3¼ hours' time to compress this amount of air to pressure just mentioned, and with the 9½-in. pump would take about two hours. The foregoing, which is not an overdrawn case, shows decidedly the very considerable losses in wasted time and air, wear to the compressor and decreased efficiency of the brake through a lower maximum power attainable and inability to quickly restore train-pipe pressure to the standard, resulting, in a great measure, from a long as against a short piston travel. Yet another loss is the longer time required to obtain a full application of brakes, and this is rendered more serious by the speed then being highest.

An advantage of the short travel is a quicker release. . . . Then, too, where necessary to make two or more applications without recharging, the brake power is not reduced so much in the auxiliary reservoirs.

A very short travel, such as 4-in., is believed inadvisable, even if possible to attain, owing to the rapid increase of brake cylinder pressure resulting from small train-pipe reductions which, through train-pipe leakage and indifferent braking, would result in an increased number of applications, thus offsetting the gain by short travel. This feature becomes less prominent as the travel is increased, and it is the opinion of your committee that a uniform travel of 6 in. would be most desirable for both freight and passenger cars. However, in the adoption of a standard the governing considerations should be the state of perfection that is generally attainable in practice . . . To arrive at a fairly correct conclusion we must, therefore, consider the effect of varying travel in the same train. . . .

Varying Travel in Same Train.—One of the greatest difficulties encountered in making good stops with long air-braked trains is prevention of shocks resulting from unequal reduction in speed at different portions of train, one of the principal causes of which is unequal distribution of retarding power. As variation in piston travel is responsible for much of this, making it more uniform lessens the evil to a considerable extent. . . .

Again, lessening the retarding power applied to wheels reduces their tendency to slide, or, in holding down grades, to overheat, causing tires to loosen or cast wheels to crack. Therefore, as the more uniform is travel the lower will be the maximum power required on any car to produce an equal amount of train retardation, it follows that for these reasons the limits of variation should be as much restricted as possible. Table No. 1 will give a clearer conception of the difference in cylinder pressure resulting from variation in travel.

It is believed that the limits of piston travel variation, with full service application from 70-lb. train-pipe pressure, should not exceed 3 in. (5 to 8 in.) on freight cars, and 2 in. (6 to 8 in.) on passenger cars, and that this variation should be further reduced where and whenever possible. Also, that for passenger cars, at least, the travel should be determined and adjustments made in accordance with plan suggested further on under the head of "Basis fer Travel Adjustments." Where this plan is followed it will be found necessary to make the limits 7 to 8 in. if brake rigging is weak, total leverage high or much lost motion exists in running gear; but where the contrary is the case that 6 to 7 in. can be employed to advantage.

Those having to do with the adjustment of piston travel should be made to understand that adjustments should be made at or as near to the minimum limit as possible—where this cannot be approached within ½ in., the cause should be remedied. Many cases have been noted where travel was reduced on freight cars to just within the maximum limit, thereby rendering the brake less efficient than it should have been made, and necessitating another adjustment unnecessarily soon.

Piston Travel Tests Made.—Through the courtesy of the St. P. & D. R. R. officials, and the deep interest taken in the subject of piston travel by the head of their mechanical department, Mr. G. D. Brooke, much valuable information was obtained by running and standing tests, the results of which were recorded in a novel and absolutely accurate manner. The tests were made under the direction of the chairman of this committee, assisted by Mr. George R. Parker, a member of the committee, and in charge of air-brakes on the St. P. & D. R. R., and W. O. Johnson, of the same road. St. P. & D. coach No. 45, which had been in service about eight years, and was just out of the shop, although no repairs of any consequence had been made to the running or brake gear, was especially fitted up for making the tests. The coach, which had four wheel trucks, weighed 49,100 lbs., was braked at 86.5 per cent., had 10-in. cylinder and Westinghouse quick-action triple valve, and, in the first series of tests, was equipped with the following brake gear:

Lever sizes—Cylinder, ⅞ × 4 × 30 in. long; hodge, ¾ × 3 × 36 in. long; live, ¾ × 3½ × 36 in. long; dead, ¾ × 3½ × 27 in. long; proportion of latter, 4½ to 1; pins, ¾ in.; brake beams, white oak, 4 × 4 in. at ends, and 7 in. deep at center.

In second series of tests the only change made was to apply new brakebeams of same dimensions, but having a trussing 7 in. deep made with ⅝ in. rods.

In preparing for the third series the M. C. B. standard brake rigging and metallic beams were applied; but some preliminary standing tests showed more deflection of beam than with the trussed oak. Therefore, another make of metallic beam having a truss was substituted, and gave much better results. One hundred and sixty-nine standing and 191 running tests were made, with few exceptions the latter being in regular passenger train service. The coach was fitted with a Thompson indicator having a 50-lb. spring and recording cylinder pressure and piston travel. The ratio between piston travel and that shown on card was 2½ to 1. In the last series of tests made, St. Paul to Duluth and return, a Boyer speed recorder and a clock were employed to determine the speed from which stops were made, and the time consumed in making same. In this series a gage was connected to the cylinder of another car and readings taken at each brake application. In all tests the train pipe reductions were read from a gage connected direct to the train pipe of coach No. 54. The foregoing will show the completeness of the tests and the extent to which the association is indebted to the officials of the St. Paul & Duluth Railroad Co.

Indicator Cards.—For the information of such as may not be familiar with indicator cards as taken from the brake cylinder, the following explanation is made: The straight line at bottom represents atmospheric, or, as shown by the gauge, no pressure. The two lines above indicate the pressure in brake cylinder and the piston travel; the upper being made as the air enters, and the other as it releases. The extreme left of upper lines indicates the release position or brake off. Pressure and piston travel at any point can be determined with special scales by drawing a line at right angles to the base, and from it through the upper ones. The vertical distance from base line to intersection with either above gives the pressure and the horizontal distance on base line from point where vertical line touches it to the end of upper ones at left gives piston travel at which the pressure just determined was developed.

Lost Travel.—Theoretically, the amount of piston travel that should result from any given brak-eshoe clearance would be the product of this clearance multiplied by the total leverage of brake. The term "lost travel" is applied to that amount which produces no proportionate shoe clearance in brake release. . . . The extent of thislost travel is not nearly so apparent in standing as in running brake applications; this being due to the shaking or vibration while running, which assists in developing it. Tests made with the McKee slack adjuster, which cannot take up until the predetermined travel of piston is reached, have demonstrated that . . . the pistons would travel from an inch to an inch and a half farther running than standing. Nor does this represent the real amount of difference that exists, as the adjuster does its work under the mean application of the brake, which it is safe to say is ordinarily represented by a 40-lb. cylinder pressure or less. The actual amount could only be shown with it by a standing test made after at least 16 full service applications running.

The extent to which this lost travel exists, together with the manner in which it can be reduced, is most effectually demonstrated by the indicator card, and, with this object, representative cards selected from those taken on the St. P. & D. R. R. are here submitted.

The theoretically perfect brake would make a card having a slightly raising application line until all shoes were broght in contact with the wheels, from which point the line would raise vertically. Therefore the amount of inclination of this line to the right after pressure commences to accumulate in the cylinder is a measure of the amount of lost travel existing. Standing cards taken with a like arrangement of indicator afford a ready and correct means of comparison, where changes in rigging have been made, by measuring their piston travel between 15 lbs. and 40 lbs. This is not true of running cards, however, for reasons that will be mentioned later on.

A comparison of the three sets of cards included, between Nos. 1 and 15, will indicate the betterment resulting from strengthening brake rigging. To ascertain the amount of this the average cylinder pressure for 30 running applications each on two cars (found to be 40 lbs.) was taken, and measurements made on standing cards from this point back to a 15-lb. pressure, which latter amount would insure shoes being brought firmly against the wheels. The results were: With M. C. B. standard levers, rods and pins and a good metallic beam, an average increase was had between these pressures of 1⅝ in.; with light levers, rods and pins and trussed wooden beams the average was 1⅝ in., or an increase of 40.5 per cent.; with same gear, but beams not trussed, the average was 2 7/16 in., or a farther increase in travel over the strong gear of 110.8 per cent.

The measurements were taken from standing cards, as it was found that another factor causing increase of travel entered into the running tests in such a varied manner and degree as to render correct deductions in this regard well nigh impossible. This factor is the lost travel due to other causes than the deflection of brake levers and beams. . . .

Piston travel measurements on cards 8 and 13 show as follows: No. 8, between 15 lbs. and 40 lbs., gives 1⅝ in. increase, and between 15 lbs. and 68 lbs. gives 3⅜ in. increase; No. 13, between 15 lbs. and 40 lbs. gives 1¼ in. increase, and between 15 lbs. and 68 lbs. gives 3¼ in. increase, the difference of ⅜ in. and ⅛ in. respectively being due to the stronger brake gear.

Comparison of cards 4 and 5, 9 and 10, 12 and 15, will indicate, by the more rapid rise in cylinder pressure of running cards at the commencement of application, the existence of even more lost travel than previously noted. This is because the standing cards shown were taken after the slack or lost motion had been drawn up by previous applications and parts had not returned in release to their normal positions. The lesson here is that the apparent brake shoe clearance with a car standing is not the actual amount unless no brake application was made during or after stop. As accurate measurements as could be made indicated the amount of this to be about 1 in.

We have, then, in a full running service application, made from 70 lbs. and with about a 9-in. travel, 1⅛ in. + 3⅜ in. (the difference between 15 lbs. and 50 lbs. cylinder pressure standing) + 1 in., lost travel, or a total of 5⅛ in., leaving 3⅛-in. piston movement to give shoe clearance in release, equivalent to about 1 in. of the latter. The strong rigging, beams included, reduced this about 1⅛ in., leaving 4⅜ chargeable to other causes.

There was one element causing this, however, that is not always present. On card No. 13, especially, there will be noticed a marked falling off of the admission line midway of its height. When noting the lost motion in boxes and brasses, the oil box cover was raised, and it was seen that the brasses would not only move with the journal toward the center of truck, but that they would tip up on edge when the pressure in cylinder approximated that shown on cards where falling off occurred. When the brake was released, the brass would right itself and move back some toward the center of box. This was with the car standing and after everything had been drawn up taut by service and emergency applications made from 100 lbs. pressure. Standing tests made on another car having well worn brasses failed to tip them, although considerable movement was had. Allowing ⅝ inch travel for this cause, leaves 4 in., and this further emphasizes the need for betterment of truck construction. . . .

A reference to figures showing loss of air with a uniform travel of 9 in. instead of 5 in., will convey an impression of the amount of similar waste here lost by travel. If the travel is maintained within reasonable limits the loss is from insufficient brake shoe clearance.

The effect of strengthening the brake rigging is shown graphically in comparing cards 2, 8 and 13 by a nearer approach to a vertical of the admission line.

In Nos. 1, 2, 6, 7, 8, 9, 10; and 11, 12, 13, 15, no change in adjustment was made in taking each series.

The effect on piston travel of jolting the car with engine after brakes had been set while standing, is shown in cards 3 and 14. These tend to verify the difference shown between running and standing tests. . . .

That the name "metallic beam" carries with it no guarantee of efficiency was indicated by the standing tests of one such, mentioned previously. Eliminating all considerations of loss by friction, a theoretical pressure of 9,400 lbs. on this beam (pressure derived from 53 lbs. in a 10-in. cylinder, and total leverage of 9) resulted in a deflection of ⅛ in., while 10,250 lbs. gave 3/16 in., and 12,000 lbs., not an unusual pressure, gave ¼ in. The white oak beam used deflected with 9,400 lbs. 3/32 in., and when trussed 1/16 in. With 10,250 lbs. it deflected (plain) 5/32 in., and when trussed 3/32 in. The trussed metallic beam used in last series of tests deflected but 3/64 in. under 10,250 lbs. load.

There was one bad feature noticed with both metallic beams, and which the railroads should not countenance. The holes for receiving brake lever pin were cast and increased in diameter toward slot for receiving lever. This results in a poor fit at the start and rapid wear to pin, thus nullifying one of the main objects sought in employing accurate sized pins, and, for that matter, metallic beams.

Basis for Travel Adjustments.—As it has been demonstrated that the travel running is considerably greater than when standing, the question arises, which shall be the basis for making adjustments? The difference on passenger cars between a full service application from 70 lbs. made standing and running is 1¼ in., and employing 90 lbs. train pipe pressure for the standing test (service application), reduces this difference to ½ in. or ¾ in. With freight cars the difference is not quite so great, but is proportionately reduced by employing 90 lbs. train pipe pressure for the standing test. In view of these facts, it is believed advisable in making yard tests, especially, to employ such a pressure and to base adjustments on the travel it gives with a full service application. Other gains would result, such as decreasing the liability of rigging to fail or hose to burst while in service. . . .

Height of Brake Shoes.—Where shoes are so hung that they descend as car is loaded, the greater the amount of this downward movement the more increase of travel will resuit. Also, the farther they are hung below the center of wheels with car empty, the more increase of travel will be had from the same amount of downward movement. Where possible the brakebeams should be so suspended that the lowering of car body would not affect them.

Leverage and Shoe Wear.—The amount piston travel will increase with a given brake shoe wear is dependent on the total leverage employed, increasing and decreasing in the same ratio as it. It follows, then, that the lower total leverage is employed the less expense need be incurred through making brake adjustments necessary to maintain travel within certain limits. Also,

that if an automatic adjuster is employed, it could be made more compact, as the range of its work would not be so great; and the wear on it would be less. In addition, the shoe clearance for any given travel will be greater.

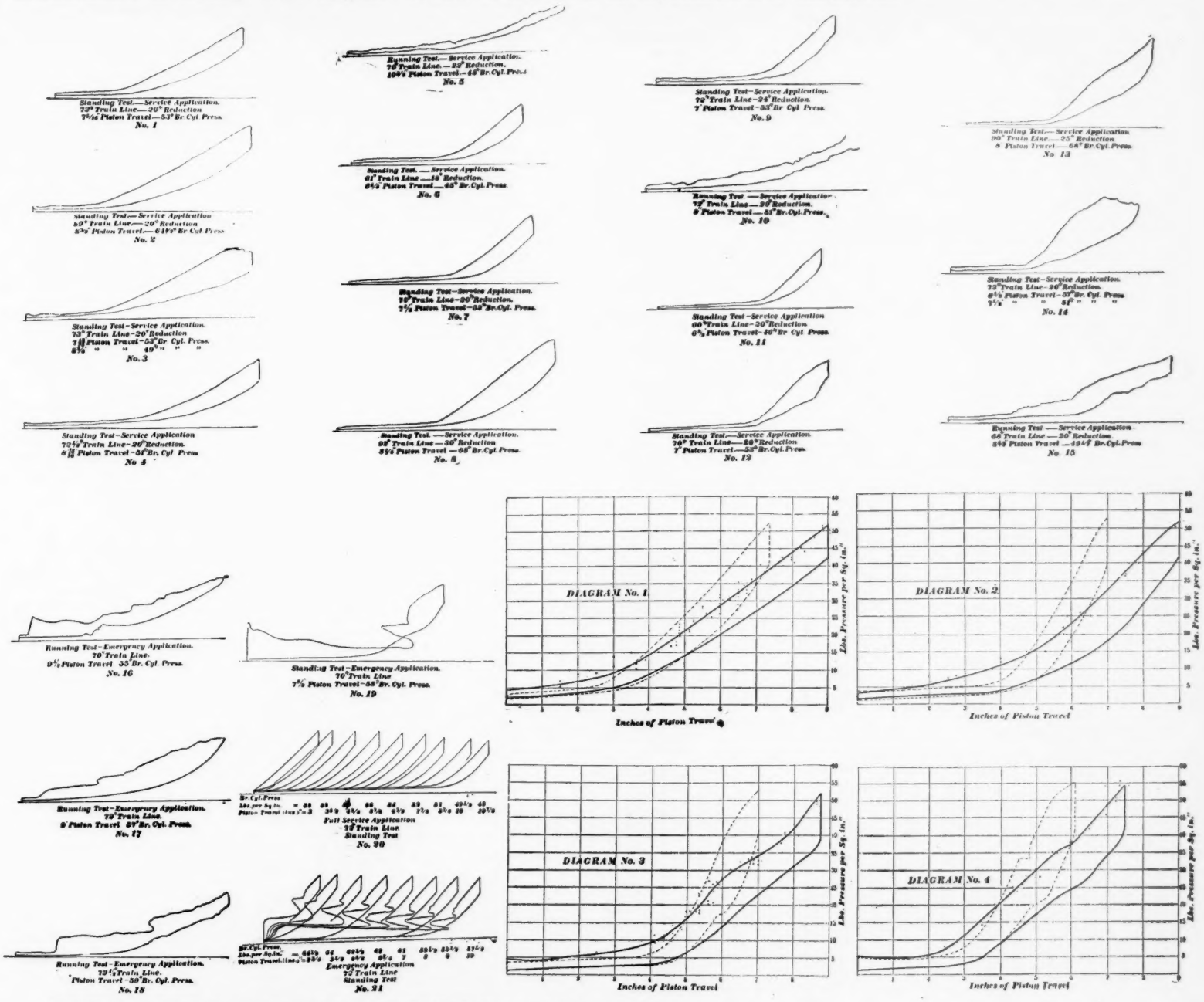
The larger the bearing surface of brake shoe the less reduction in thickness will result from a given amount of work performed. Therefore, within reasonable limits, this offers another means for extending the time between adjustments.

Levels vs. Grades.—It is believed that no difference in travel should be made between levels and grades; for, while more braking must be done on the latter, the use of the pressure retaining valve increases the effectiveness of the brake and materially reduces the amount of air consumed. A very short travel is here subject to the criticism before made, viz., that a small reduction in train pipe pressure gives such a large increase in the cylinder as to frequently result in heavier applications than desired. Also, the short travel somewhat decreases the effectiveness of the retaining valve, as its $\frac{1}{10}$-inch ascertained from engineer that he has recharged train and applied brakes.

To Car Inspectors.—Brakes are to be applied at terminals on all passenger and freight trains before incoming engine is detached, unless specifically noted to the contrary. Outside of trains excepted, you will delay your inspection until this has been done, and then, while making same, note whether all brakes are applied, if any leak off and distance pistons travel, that necessary repairs may be made wherever possible. Where any defect discovered cannot be repaired, a defect card must be filled out and securely attached to car. Whenever a car so carded is found in a yard, and time and facilities permit, you will repair same and remove card, which, after being filled out on back, must be forwarded promptly to the proper authority.

General Instructions.—If train must be switched before outgoine engine is attached, it will be necessary for the latter to make such additional test as will insure that all brakes in good order are cut in and train pipe connected and open back to the rear of last air car. Trainmen and inspectors must inform engineer before departure of train as to the number of air and non-air cars in same, and the condition of former; that is, whether all air cars are cut and in good working order. He should also be told if any wheels in train are trains en route may be reduced to a minimum from this cause, and also, as to allow for the difference in minimum adjustments were 90 lbs. pressure is employed in yards. Cards 16 to 21, inclusive, are given as being of interest in connection with this subject. The loop in No. 16 was caused by brake being held on to stop, resulting in a short backward movement of brake piston. The smoothness of release line No. 17 is due to the brakes having been released at speed. The zigzag portion of application line No. 19 results from the suddenly arrested motion of brake gear when shoes strike the wheels. It is most noticeable in standing applications. In all cards it will be seen that the release line does not join the base until the brake is entirely off. This is caused by the cylinder and brakebeam release springs. Nos. 20 and 21 show the effect of shortened travel in service and emergency applications made while standing.

Diagrams 1 to 4, inclusive, are intended to show the difference between a standing application and others made running with the same adjustment. The broken line is a reproduction of a representative standing card, and the full one is a resultant of many running applications; the terminal pressure, or that where brake was held for an interval between graduations, and the corresponding piston travel being indicated by a dot.



Cards No. 1 to No. 5, inclusive, are from coach No. 54, with light brake rigging and plain wooden beams.
Card No. 3 shows increased piston travel by jarring coach after brakes were applied.
Cards No. 4 and No. 5 were taken without changing the slack, showing increase of travel, while running, beyond that of standing test.
Cards No. 6 to No. 10, inclusive, are from coach No. 54, with same brake rigging, as previous cards, with new wooden beams trussed.
Cards No. 9 and No. 10 are to be compared for piston travel, standing and running.
Cards No. 11 to No. 15, inclusive, are from coach No. 54, with M. C. B standard brake rigging, and trussed metallic brakebeams.
Card No. 14 shows increased piston travel by jarring coach after brakes were applied.
Cards No. 12 and No. 15 are to be compared for piston travel, standing and running.
Weight of Beams.—Plain wooden beams, 99 lbs.; trussed wooden beams, 129 lbs.; trussed metallic beams, 82 lbs.
Card No. 16 was taken with light brake rigging and plain wooden beams, coach on rear of train, three plain triple valves in front.
Card No. 17 was taken with light brake rigging and trussed wooden beams, coach on rear of train, three plain triple valves in front.
Card No. 18 was taken with M. C. B. standard brake rigging and trussed metallic beams, coach on rear of train, five plain triple valves in front.
Card No. 19 was taken with M. C. B. standard brake rigging, trussed metallic beams; application was made with the test valve in the yard, on coach only.
Cards No. 20 and No. 21 were taken with light brake rigging and trussed wooden beams; applications were made with valve in the yard; travel was shortened with hand brake.

Diagrams with Report on Piston Travel. By a Committee of the Air-Brake Men's Association.

exhaust port can more rapidly reduce the cylinder pressure.

In order that existing piston travel and the general condition of the brake may be correctly noted, it is necessary to have a certain amount of uniformity in the application of brakes for tests. With this object in view and that of consuming the least time, the following rules are submitted for division terminal tests where engines are changed of both freight and passenger trains:

RULES FOR DIVISION TERMINAL AIR-BRAKE TEST.

To Engineers of Freight and Passenger Trains.—As soon as possible after stop is made, previous to engine being detached from train, you will re-charge latter to at least 50 lbs. for freight and 60 lbs. for passenger, but not over 70 lbs. for either; then make a 15-lb. service reduction, and return valve handle to lap position until air has been separated between engine and train. The outgoing engineer should have main reservoir pressure up to at least 90 lbs., but train pipe pressure not over 45 lbs., and brake valve handle on lap position when air is being coupled to train. Valve handle must not be removed from lap position until signal to release is given. The ability to release all brakes will indicate that connections are properly made, and will complete test.

To Trainmen and Yard Crews.—At division terminals, when disconnecting engine from train, you will cut off the air-brake last, but this must not be done until having known to have new flat spots. Piston travel in these tests should not be less than 4½ in. on freight and 5½ in. on passenger, nor over 8 in. on either. In readjustments it must be made between 5 and 6 in. on freight, and 6 and 7 in. on passenger.

It is possible to judge quite accurately by the discharge from the brake valve when applying as to the number of air cars coupled up. Engineers are expected to cultivate this, and by its aid and the feeling of the train under light brake application assure themselves in season that brakes will respond properly where any failure to do so would likely result in an accident.

The signal to release brakes when making terminal tests of passenger trains must be given through the train signal apparatus operated from the rear of last car, the signal being four blasts of the whistle or taps of the bell.

Where terminal stop on freight train is made from over 50 lbs. pressure, other conditions permitting, a sufficient additional reduction can be made after stopping (brakes being held on), to make a total of 15 lbs., thus saving time and air. On passenger, however, brakes must be invariably released, recharged and reapplied as per instructions.

A 15-lb reduction in train pipe pressure is advised, as this will apply brakes with sufficient force to determine the piston travel sufficiently accurate and yet permit the triple valve to close the communication between the reservoir and brake cylinder that any leakage in latter may be more apparent.

The limits within which readjustment is not required are so stated that, while maintaining an efficient brake, delays to

No. 1 represents the light rigging tested in first series, before referred to. No. 2 is the same rigging with beams trussed, or second series. Nos. 3 and 4 represent the M. C. B. standard brake gear and strong metallic beams used in the third series of tests, No. 3 being with a longer travel than No. 4.

In No. 1 a single point will be noticed very close to the terminal pressure of the standing card. This was the result of a rapid service application at slow speed, the train coming to rest before the usual amount of lost travel obtained running was had.

Recommendations.—1st. That yard tests be made from a 90-lb. train pipe pressure and full service application, and piston travel adjustment based on this, be made 5½ in. for freight and 7 in. for passenger.

2d. That road tests be made from not less than 50 lbs. pressure for freight and 60 lbs. for passenger, and that readjustments be made to between 5 and 6 in. on freight and 6 and 7 in. on passenger where found less than 4½ in. on freight and 5½ in. on passenger, or where over 8 in. on either.

3d. That brake cylinders of such size be employed as recommended in Westinghouse Air-Brake Company's circular of Dec. 1, 1895, that total leverage necessary to employ may not be excessive.

4th. That brake rigging (including beams) of sufficient strength be employed as will reduce deflection to a minimum.

5th. That lost travel due to truck construction and wear be as much reduced as possible.

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856.
Published Every Friday
At 32 Park Place, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The report of gross earnings of railroads for the month of March as compiled by *The Chronicle* is not as favorable as that of February. The February return showed an increase of 13.52 per cent.; for March the increase was only 4.42 per cent. Out of the 123 roads reporting, 53 show decreases; this is in spite of the fact that the grain movement has continued to be much larger than last year. The falling off is explained partly by bad weather and partly by the general unsatisfactory state of trade. March was an exceptionally bad month, having been cold and stormy, and having had heavy snowfalls and much high water. It does not surprise us to see in the railroad earnings evidence of depressed trade conditions for a great many things are conspiring now to discourage traders and manufacturers. We are disposed to think that the chief of these discouraging influences is the uncertainty as to the financial policy of the nation; but another factor of great importance has been the jingo talk and resolutions in Congress. That these have seriously disturbed business there can be no reasonable doubt. Add to this the usual disturbance of a Presidential year, and we find sufficient reason for a gloomy outlook. The grain movement continued to be heavy. The receipts at the Western primary points amounted to 36¾ million bushels as against a little less than 21 million bushels in 1895. At Chicago the receipts were 19¼ million bushels against 8¾ millions in 1895. The roads showing large gains are those affected chiefly by the grain movement. The Chicago, Milwaukee & St. Paul leads with an increase of over $493,000; next comes the Canadian Pacific with $298,000, then the Great Northern with $246,000, then the Chicago Great Western with $160,000 and the Minneapolis, St. Paul & Sault Ste. Marie with $127,000. These are all the roads that show an increase of over $100,000. There are seven with increases of over $50,000. The only road showing a decrease of over $100,000 is the "Big Four" on which the falling off was $111,125; the Texas & Pacific lost $84,832. In the Southwestern group of roads there were many more showing losses than gains, but the aggregate decrease was not heavy. In the South the losses are about as numerous as the gains.

Mr. Menocal appeared last week before the Congressional Committee which has in hand the Nicaragua Canal bill. He and Mr. Warner Miller have agreed upon what appears to them an important point in attacking the report of the Engineer Board. Both of them in their testimony have dwelt upon the fact that the examination made by the Engineer Board was rapid and superficial and that consequently the Engineer Board did not know enough about the canal to criticise the plans and estimates of the company. This, the reader will see, gives away the whole case. The main contention all along has been that not enough was known about the conditions to warrant anybody in risking his money, much less in risking the money of the nation. Supposing we grant that the Engineer Board did not know enough to warrant it in criticising the company's plans and estimates, it follows then that the company does not know enough to warrant it in soliciting capital or in promoting the sale of its assets to the government, for the Engineer Board knows all that the company knows. This we suspect would be very clearly brought out if Appendix B to the report of the Board could be made public. The title of that appendix is "Correspondence with the Canal Company," and so far as we have been able to learn it shows the persistent and repeated efforts of the Board to get information from the canal company and repeated acknowledgment on the part of the company that it does not possess the information. If the Committee has not seen this appendix its obvious duty is to call for it, and it is a duty to the country to make it public. No defense could be weaker or more transparent than to attack the Board on the score of its ignorance when we consider that the Board was in possession of all the knowledge accumulated by the company. Another point on which Mr. Menocal and Mr. Miller seem to have agreed is to express surprise that the Board recommends no modifications but such as increase the cost of the canal, and they say further that the engineers have estimated on an ideal canal and the company on a business canal. An adequate reply to this can only be made by a specific analysis of the report; but as argument it is begging the question. The engineers have estimated on what they consider a safe and adequate canal, judging by human experience—of which they have a good deal—and by all the facts in the case—of which the company could give them but few. They back up their estimates and recommendations by arguments that appeal powerfully to the engineer—arguments which they could doubtless maintain with great force before the Congressional Committee.

The New York grain merchants keep up their agitation for a reduction of railroad rates from the West. The Erie Canal will be open in a few days, and the Gulf of Mexico is getting too hot for corn, so that New York will soon be enjoying what she calls her rightful supremacy in the export trade; but Baltimore and Newport News are still active and the demand for a change in the differentials between those cities and New York is pressed as vigorously as ever. The managers of the Joint Traffic Association are still wrestling with the subject. This question of rates on export grain has to be settled, if ever it shall be settled, on the principle of what the traffic will bear, and it must afford an instructive lesson to cost-of-service theorists. It may be said, however, in passing, for the comfort of such, that with the active competition which is now sure to be kept up summer and winter, there is no danger that the rates on grain will ever get much above the cost of the service. They are liable at any time to go below it. The railroads, although all the time figuring on what the traffic will bear, are also compelled to constantly keep in mind the limits of what they themselves can bear. When freight is carried at less than four mills per ton per mile, as grain is now being carried, the railroad manager is obliged to keep a very close watch on his balance sheet. His engines and cars are constantly wearing out, but he is often in doubt whether it will pay to build new ones for traffic paying such a small profit. The grain men certainly cannot wish to have their facilities curtailed; perhaps it would be profitable for them to look at the actual figures—the railroad side—now and then. The distance from Chicago to New York is just about the same as to Newport News, 962 miles. The rate on grain to the latter point is 17 cents per 100 lbs., and to the former 20 cents; but as the New York roads have to pay out about 3 cents to get grain lightered to the ocean vessels they receive for rail transportation the same as the Chesapeake & Ohio line, 17 cents. This is equal to 3½ mills per ton per mile, at which rate large trainloads must be carried, and a good many of them, to pay the interest on the cost of the track, terminals and equipment. The New York men expect, of course, that their roads, if unable to reduce rates, will compel the Southern lines to make an advance; but compulsion is not easy in such a case. Those lines, with a small general business, look upon the grain traffic, even at a very small profit, as a necessary of life; they must live on that or nothing.

In some respects New York is at a disadvantage by reason of its bigness. The lighterage of grain to vessels all around the harbor is a wasteful and expensive process, for there is no physical obstacle to the loading of the largest vessels directly from the railroad companies' elevators, as is done at the other ports. But the canal boats, in the summer, can take grain to the vessels, without additional cost, and so the vessels will not go to the grain; and the railroads have to do as the canal boats do. This custom is so firmly entrenched that it prevails through summer and winter. The ocean vessels have large quantities of other and better paying freight and so they accept grain only at the last moment, to fill up their loads. The Baltimore grain men, when attacked by New York, retort that rates from New York can never be known beforehand, because of this partial loading. The other ports get the grain through from the fields to Europe cheaper than New York does, and this is partly due to the large cargoes carried; and when the New Yorkers will charter large vessels to go directly to the railroad elevators they can then more reasonably talk about their losses from discrimination. When they come to make practical argument before the railroad managers, this point, brought up by the rival cities, will have to be taken into account.

The alleged enormous damage inflicted on the railroads of the United States by the excessive generosity of our government in allowing the Canadian Pacific to carry goods across the boundary line in bond, has been again made the subject of dreary columns in a New York newspaper, but we have not noticed that anybody cared anything about the matter, and the shouters seem to have subsided. Senator Elkins, of West Virginia, took up the argument in Congress, but in the multitude of words we find no statistics at all that bear on the subject in any tangible way; nor any argument, worthy of the name, except that the Canadian Pacific makes too much money out of business originating at or destined to points in the United States. The chief newspaper in this exploit is not the same one that tried to get people interested in the matter a year or two ago, and Senator Elkins is, we believe, a new convert; but there is nothing new in the subject matter. Assuming that the Canadian Pacific does get some traffic which would go to competing lines wholly within the United States, if we enforced reloading or inspection, or both, at the boundary line (though no American road seems to be worrying over the matter), the one sufficient answer, so far as the Government is concerned, is that the suspension of the facilities for easy transfer across the border would hurt the United States as much as it would Canada, if not a good deal more. It is asserted that as much Canadian freight is carried through this country as of American freight through Canada. Certainly there is a great deal. Then, again, American roads like the Michigan Central enjoy the privilege of carrying freight and passengers through Canada; we cannot strike at the Canadian Pacific without hitting the Michigan Central also. Why do not New England shippers refuse to send their goods to the Pacific coast over the Canadian Pacific? Probably because they get favorable time and rates. The New England manufacturers will be heard from, as they were before, if Congress takes any action in this matter. It would save much nonsensical waste of words if these advocates would come out into the light and tell who their client is.

The Brooklyn Bridge and the Elevated Roads.

A bill has been presented in the New York Legislature authorizing the trustees of the New York and Brooklyn Bridge to lease the bridge railroad to the elevated railroad companies of New York and Brooklyn, or to either of them. The main purpose of the bill as drawn is to give the Brooklyn elevated railroads a terminus in New York City, the provision for a connection with the lines of the Manhattan road in New York, being a secondary matter, apparently. The proposed law authorizes the bridge trustees to build a connection with the elevated roads in Brooklyn and to build an extension 1,500 ft. long in Centre street, New York, which would provide terminal tracks at that end.

The bill, if urged, will probably be strongly opposed. The lessee is to do the passenger business now carried on in cable cars by the Bridge Company, but the annual amount to be paid for rent is to be based on the receipts of the cable cars during the past three years, which is regarded by many as too low a basis. The lessee must agree to carry passengers from the New York terminus to any point on the Brooklyn elevated roads for 5 cents. At present this trip costs 8 cents, and one change of cars with much stair-climbing, is necessary.

This bill seems to have been the outcome of a desultory discussion among citizens having no very direct interest in the matter. Some one remarked that the elevated railroads could be easily connected with the bridge tracks, the officers of the elevated companies heard of it, and, being on the lookout for anything that would turn the thoughts of the public away from tunnels, trolleys and other devices tending to impair the popularity of the elevated lines, they at once

offered to take the bridge tracks right into the family, so to speak. For the Brooklyn elevated roads it may be a profitable scheme to carry passengers a mile farther toward the center of New York without additional charge; they may get a large number of passengers who now ride to the bridge in surface cars; but the question of rental would require careful consideration in any event.

For the elevated on the New York side, however, the proposed connection is of more doubtful value. Quite likely it is well for the Manhattan company to get control of all the existing rights of way that it can, at prices within reason, for the future promises to give abundant traffic—in the lower part of New York—to all tracks that are now built or are likely to be built; but we cannot see that the present traffic from "up-town" to Brooklyn, while it is considerable, is susceptible of being helped much by through trains. It would be a public convenience to have 25 trains a day from Harlem and the Grand Central station to Brooklyn; but when should they be run? Passengers would not wait half an hour, or even ten minutes, for a through train when by submitting to one change of cars they could start within one or two minutes; and even if they were willing to wait, the Elevated stations have no suitable waiting rooms to hold them. The Manhattan probably has an eye on the possibility of a cross-town line from the Jersey City ferries. Trains from West street, New York, to the farther end of Brooklyn Bridge would do a considerable business, but, as already intimated, such an additional elevated structure would probably be most certainly valuable as an adjunct to the existing north and south lines. The mechanical difficulties of getting long and heavy trains over the steep grades of the Brooklyn bridge are not inconsiderable.

The Bicycle Law of New York.

The law compelling railroads to carry bicycles in baggage cars free was passed by the New York Legislature on April 8. Section 37 of the railroad law, fixing the maximum limits for the rates of fare on the railroads of the state, says that the rates named are for "a passenger and his baggage," and section 44, chapter 565, prescribing the regulations for checking baggage when taken for transportation, now has the following paragraph added to it:

"Bicycles are hereby declared to be and shall be deemed baggage for the purpose of this article, and shall be transported as baggage for passengers by railroad corporations and subject to the same liabilities, and no such passenger shall be required to crate, cover or otherwise protect any such bicycle; provided, however, that a railroad corporation shall not be required to transport, under the provisions of this act, more than one bicycle for a single person.

The bill was passed in the Assembly by a vote of 127 to 1, the only member voting against it being Mr. Husted. In the Senate there were four negative votes, those of Senators Brackett, Cahoon, Mullin and Sullivan. The proposition in the House to amend the bill so that the railroads might charge two mills a mile on a bicycle not released was favored by Messrs. Butts, Cain, Costello, Enders, Eldridge, Husted, Van Keuren, Nixon, P. J. Andrews, Graves and C. Smith.

As we have remarked in previous discussions of the subject, it is quite possible that a railroad can in some cases make money by carrying bicycles free, for bicycle riders may thus be induced to patronize the cars when otherwise they would not; but the concession is, nevertheless, an injustice to passengers without a bicycle or baggage of any kind, and cases are likely to arise where the injustice will be material; as, for instance, where a train is delayed to load a lot of wheels. If the baggage room is not very close to the point where the baggage car stops, 20 wheels would require 10 men to convey them from the room to the car, and 40 wheels 20 men. Trains running west from Jersey City sometimes have 50 or more bicycles. Under a law like this the owners would demand checks at New York, and it would require 25 baggage men to get the wheels across the ferry.

Whether the injustice of the law be great or small the principle of it is outrageous. It has been carried, first, because 100,000 voters are supposed to demand it, and in a Presidential year votes are supreme whether their demands be right or wrong; second, because most railroads, as long as only a few bicycles were offered, carried them free, and, third, because the railroads have so long kept up, and even strengthened, another unjust custom, which is now so venerable that it is looked upon as righteous law—the custom of carrying a passenger with a 150-lb. trunk at the same rate as one with no baggage whatever. The other thousands of voters who do *not* wish to carry a bicycle on the cars have no fear that the railroads will throw any part of the new burden of expense upon them, and they fail to realize that but for this burden the railroad could sooner reduce the fares that they have to pay; so the only objectors to the law will be the railroads. (A road which is not charging up to the legal limit for fares could advance the ticket rates and then make a discount to passengers without bicycles; but the rates of the New York Central, the road most affected, are fully up to the limit.)

If the railroads resist the law in the courts they will probably have to argue chiefly on the ground that a bicycle does not properly come within the well settled definitions of baggage which the courts have repeatedly laid down. If those definitions are followed, a quadricycle, a canoe or a flying machine will have to be included, as surely as a bicycle. If these are excluded on the ground that they are unreasonably bulky the bicycle must also be excluded. It is not so great an abuse, but it is an abuse. The 300-lb. trunk is an abuse of the so called principle; the 200-lb. trunk a lesser one, and so on down. In our opinion, as already intimated, the 150-lb. trunk, and even one weighing 75 lbs., comes within the same category and a small charge ought to be made on all baggage. The added revenue would be appreciable, and if the railroads would promise to return a fair share of this revenue to the public by a reduction of fares they would probably make money by the operation in the end.

The constant longing in the human breast to get something for nothing, which of course is at the root of the demand for this bicycle law, has come to the surface in amusing shape, since the "glorious victory" in the legislature. The New York *Tribune* of Friday last says:

The passage of the Armstrong Baggage bill was the one topic of conversation among riders of the wheel yesterday. Chief Consul Potter received telegrams of congratulation from all sections. Sterling Elliott, President of the L. A. W., telegraphed: "My dear Potter: Hurroo! Hurroo! Words at my command cannot express my pleasure at receiving your telegram to-day. It is the greatest stroke of business that the League of American Wheelman has ever made. We are publishing it in *The Bulletin* with a big rooster. Good boy! I shall print your picture in *The Bulletin* next week with a laurel wreath around it." This is only a sample of many of the telegrams received during the day. A dinner will be arranged shortly, at which Mr. Potter, Assemblymen Armstrong and Senator Ellsworth will be the guests of honor.

The Governor had not signed the bill up to the time this paper went to press.

Annual Reports.

The Chicago, Burlington & Quincy.—The annual report of the Chicago, Burlington & Quincy for the year ending Dec. 31, 1895, was made public last week. It was known from the regular statements of monthly earnings that a deficit would be shown as the result of the year's operations, but we find that, as a fact, this deficit has proved to be quite insignificant. The company has been obliged to reduce its dividend rate to 4 per cent. this year as against 4¾ per cent. in 1894, and 5 per cent. in 1893. In spite of this reduction the apparent deficit amounted to $722,550, which was, however, reduced by a timely cash dividend paid in by a subsidiary road, the Hannibal & St. Joseph, to $232,362 as the actual deficit for the year. The principal results of operation for three years are as below:

	1895.	1894.	1893.
Miles worked	5,730	5,626	5,561
Gross earnings	$24,874,192	$24,667,132	$31,042,970
Working expenses and taxes.	16,710,539	16,284,066	21,224,504
Net earnings	$8,163,653	$8,383,066	$9,818,466
Percentage of working expenses, including taxes	67.18	66.02	68.37

The total income for the three years, including interest and dividends on securities of controlled roads, etc., and less working expenses and taxes, has been as below:

	1895.	1894.	1893.
Total income	$10 120,283	$10,321,918	$11,589,558
Charges against income	7,562,730	7,530,786	7,614,261
Dividends	3,280,108	3,895,128	3,960,253
Deficit or surplus	D.$722 550	D.$1,103,997	S $15,044
Extra dividend from H.&St.J.	490,188		
Net deficit	$232,362		

The interest on bonded debt, the rent of tracks and depots and the payments to sinking fund, which make up the total under the head of charges against income, have remained pretty nearly the same for the three years.

It will be seen above that while gross earnings increased in the year only about $200,000 working expenses increased $426,000. This increase is due to the heavier expenditures on repairs of cars and locomotives. Less was spent on train and station service by $176,000, and the increase in repairs to track and structures was but about $44,000. Of course, comparison with 1893 is more curious than useful, that having been the year of the World's Fair. In that year the working expenses were some 4½ millions more than in 1895. About two millions of that was accounted for by increased cost of train and station service, almost one million in repairs to road and structures and over $800,000 in repairs to cars and locomotives. The President states that the condition of equipment has been improved, and that last year's estimate of about $1,000,000 required to put it into good shape has been cut down about one-half by repairs paid for out of earnings, in anticipation of a larger traffic in the last quarter of the year than was actually carried. The expenditures for construction during the year (charged to capital account) were $580,525, of which much the larger part was on the Burlington & Missouri River Railroad in Nebraska. The expenditure for equipment, being for air-brakes and automatic couplers and for machinery, was $62,766. This also was charged to capital account.

The passenger miles for the three years were as below, in millions:

	1895.	1894.	1893.
Passenger miles	258¼	255½	409½
Rate per mile	2.1 c.	2.19c.	2.05c.

The ton miles were as below, also in millions:

	1895.	1894.	1893.
Ton miles	1,822	1,770½	2,099
Rate per ton mile	0.885c.	0.912c.	0.938c.

These figures tell the story; low rates kept the earnings down, notwithstanding the increase in volume of traffic.

The classified earnings for four years were as below:

	1895.	1894.	1893.	1892.
Freight	$16.135,165	$16,135 699	$19.689,495	$22,768,067
Passengers	5,655.589	5,595,573	8,419,079	7,223,143
Mail, express, etc	3,083,437	2,935,860	2,934,395	3,011,224

The President in his comments on the report indulges in no sanguine expression of hope for the future. He does point out, however, that the crops of 1895 were much better than those of 1894, and thinks that a good effect ought to be felt in 1896 in spite of low prices. The 1895 corn crop in Illinois, Iowa, Missouri, Kansas and Nebraska amounted to over 1,122 million bushels; in 1894 it was only a little over 422 million bushels, which was the smallest crop recorded in 19 years. The largest crop ever harvested in those five states was in 1889 when it reached almost 1,218 million bushels. The corn crop of the entire United States in 1895 was 2,151 million bushels, the largest ever harvested. It is a well known fact that little of this new corn crop came forward before the end of 1895, which, of course, was an especially serious matter for the Chicago, Burlington & Quincy.

The latest gross earnings reported by this road, namely, for the month of February, are $2,568,416 as against $2,190,609 for the same month in 1895. For the two months, January and February, the gross earnings in 1896 were $5,162,021, and in 1895 only $4,565,440. The increase, it will be observed, for these two months is 13 per cent., which is a considerably more encouraging showing than that of the annual report, and we may reasonably hope that this system, which has been so especially afflicted because of the great influence of the corn crop on its earnings, and which has met the period of depression with such heroic economies, has now before it a year of comparative prosperity.

In view of the low rate of dividend for 1895 President Perkins says:

"Because five or six per cent. is now regarded as a fair rate of interest on money loaned, it is sometimes assumed that it is a fair profit on capital invested in business. But this is not all true. Money loaned on good security is one thing; and money used in enterprises involving risk is a very different thing. If persons who take business risks never received more than what would be considered a fair return on safe loans, nobody would ever take such risks in building railroads or in anything else. To leave this out of sight and so legislate that the owners of railroads, who take the risk and often lose everything, shall not, when successful, receive more profit than a fair return on good security is a policy which can only result in retarding and crippling the means of transportation, and eventually forcing the public to provide such means by taxation, with a long train of evils as inevitable as they are obvious. Railroads must necessarily take the risk of crop failure and business depression; and it is both unjust and unwise to load them down in addition with excessive taxation and arbitrary rate legislation, while the prices of the things they buy and the wages they pay are left to the natural law of demand and supply."

These last sentences are spoken feelingly, for the states through which the Burlington system extends have been the pioneers in all movements of legislative rate regulation and the like from the early Granger days to the present moment.

The commission for the construction of a city railroad system in Vienna (which is to serve suburbs also) has decided to adopt intercommunicating cars—that is, substantially, the American system. It was said that about one-third more traffic could be handled with these cars, and that a sufficient stock would cost a little less than compartment cars. The argument used against them was that they require more time for loading and unloading, which is exactly the point in which they are superior, as is proved by a comparison of the necessary length of station stops on the London underground and the New York elevated lines. It is only where the great body of the passengers get on and off at the same station that side entrances have an advantage—as on the Illinois Central World's Fair trains.

Those who care particularly about getting the bill for the metric system through in the present session of Congress should lose no time. It will be remembered that it has been sent back to Committee. An officer of the American Metrological Society writes to us: "The friends of the bill in the House seem to think that there is a fair chance of passing it later on in the session, when information has been dessiminated in regard to it. I must confess that I do not feel quite so sanguine. I think it would be better to adopt a modified bill, which would try to introduce the metric system in a few years in all branches of Government work. With that accomplished, the next step—the introduction of the system among the people—would be quite rapidly made. If neither of these steps be taken, the system will, inside of 25 years, be adopted in this country simply because of the demands of the manufacturers and exporters, who deal largely with countries employing the metric system."

A Brussels newspaper says that the government has determined to unite the two great terminal stations in that city by six underground tracks, and to construct a central station and a girdle line around the city. Two of the underground lines are to be worked by electricity, and the fare from all points on the girdle line and the underground roads to the Central on any other station is to be at the uniform rate of two cents. The cost is estimated at $14,000,000, and the capacity at 300,000 passengers daily. The actual traffic is estimated at 40,000,000 passengers yearly, the gross earnings at $800,000,

and the net at $400,000, or less than 3 per cent. on the cost; though the lines will serve also for freight transfers and through travel. This estimate allows only one cent as the average cost of carrying a passenger, which is better than we have been able to do with the heaviest travel in the world, on the New York elevated lines.

NEW PUBLICATIONS.

The Principles of the American Law of Bailments. A Companion to the Author's Work on Contracts. By John D. Lawson, LL. D., Professor of Common Law in the University of the State of Missouri. Octavo, 668 pages; analytical table of contents; alphabetical index of cases cited and general index. St. Louis: The F. H. Thomas Law Book Co. Price $5, net.

Perhaps the general officer or division officer of a railroad may not always know how closely the law of bailments concerns him. A very concise definition of a bailment as stated by Prof. Lawson is "the holding possession of another's personal property in trust for some specific purpose" This, it will be observed, is precisely the situation in which the common carrier finds himself. Therefore a very large part of the volume before us is given up to the duties, obligations and rights of the common carrier. The first 119 pages are devoted to the story of the development of the law, which is very recent, and to laying down the principles. Seventeen pages are given to the innkeeper; then the great mass of the volume, namely, 353 pages, treats of the common carrier. Forty-six pages are allotted to the telegraph, telephone and other modern agencies, including sleeping car companies and mail carriers. The final division of the book—64 pages—which treats of questions of proof and damage, is also largely occupied with the affairs of the common carrier. It will be observed therefore that the volume ought to be of particular interest to railroad officers, provided that it is written with due regard to the needs of men who want their law stated in a simple, clear and concise way.

This leads us to speak especially of Professor Lawson's style and method of treatment. In a learned and entertaining address on the History of the Science of Mechanics, made by Prof. R. S. Woodward before the New York Academy of Science, he said, "In a general scientific assembly the naturalists feel great uneasiness in listening to a paper from a mathematician or physicist, while the latter are almost certain to seek relief in the open air from the depression induced in them by the wealth of terminology essential to the description of a new species." Almost every one who has undertaken to read law books has felt this depression profoundly. The terminology of the science is not the only forbidding part of law literature. Most legal writers seem to feel that they must be ponderous, involved and obscure in order to be thought learned. Professor Lawson long ago cleared his mind of any such notion, if indeed he ever had it. Lucidity of statement, and simple and logical arrangement of matter are instinctive with him and these qualities have been carefully cultivated through years of successful practice of the art of law writing, until it is possible for the layman to read his books without depression, but with interest and profit and often with real pleasure.

The work on the Law of Bailments is intended as a students' work and as an introduction to a larger work on railroads, which Professor Lawson hopes to complete some time. So, as a pioneer of the law of carriers of goods and passengers, it is of especial interest to railroad officers; and it is a good example of Professor Lawson's best method in the preparation of books at once elementary and comprehensive.

The history of bailment law in England began with the eighteenth century and for more than a century this especial branch of the law was almost insignificant in the cases reported. But toward the end of the first half of the present century a new cause had begun to act to swell the reports both in England and the United States; that is, the transportation of persons and property by steam. Then the delivery of personal property as collateral security began to be a great feature in business life, and finally, the introduction of the telegraph, the telephone, the sleeping car and the passenger elevator called for the further application of the principles of the law of bailments, until now the title "bailment" has expanded to one of the most extensive and important in the law reports and digests. Furthermore, a law book on the subject "becomes old in less than ten years." There is but one English book with the distinctive title of "bailments," but American writers have produced three treatises on this branch of the law; none of these, however, are thoroughly modern, and in these facts alone appears sufficient reason for writing a new book, regardless of any improvement in the method of treatment.

Professor Lawson treats the subject under two great divisions: Ordinary and Exceptional Bailments. The second of these includes innkeepers, common carriers and other public agencies upon which, for reasons of public policy, the law has placed exceptional liability. In this class the law has, on grounds not applicable to the others, thrown generally upon the bailer the extraordinary responsibility of an insurer.

The common carrier is one who undertakes for hire to transport the goods of such as chance to employ him, from place to place; and in Colorado an irrigating company is a common carrier of water. But sleeping-car companies and telegraph companies are not common carriers. In the matter of carriage of live animals the law is still sufficiently unsettled to necessitate precaution on the part of the carrier in ascertaining his liability. In England carriers of living animals are not common carriers, and this is the view in some of our states; but in most of the states carriers of living animals are common carriers and insurers to the same extent as if engaged in carrying general merchandise.

All of this is shown clearly by Professor Lawson, and he then goes on to consider the law of the common carrier in four chapters: The Duty to Receive Goods; Responsibility while They are in His Possession; Modification of that Duty by Agreement; Duty to Re-deliver the Goods. The law is set forth with admirable completeness and simplicity. In these four short chapters (they fill only 146 pages) one is put in possession of the principles, as established in the body of the common law, the statutes and the decisions.

Part III. of the Division of Exceptional Bailments deals with the common carrier of passengers. Although he is not strictly a bailee his duties and liabilities are measured by those rules of the common law established in actions against the common carrier of goods. These duties and liabilities are treated in seven chapters: Relation of Carrier and Passenger in General; Duty in Regard to Means of Transportation; Contract of Carriage; Duties and Liabilities of the Carrier During Transit; Responsibility for Baggage; Liability for the Acts of Others; The Acts of the Passenger as Affecting the Carrier's Liability. These chapters fill 194 pages. Here we find the same thorough and minute analysis, the same systematic arrangement of topics, the same clear and concise statement as in Part II., The Common Carrier of Goods.

Part IV., "Other Exceptional Bailments," treats of the telegraph, telephone and other modern agencies. Obviously, this is a peculiarly interesting chapter, dealing as it does with a body of law still even more in the formative stage than the law of railroads. The telegraph, while not properly a common carrier, is a public carrier of intelligence, with rights and duties analogous to those of a public carrier of goods or passengers. But the American courts have refused to hold telegraph companies to the extraordinary responsibility of a common carrier, and to make them insurers of the correct transmission of messages. Impartiality and good faith are the chief obligations imposed by the statutes. Telephones come under the same general rules as telegraphs; in fact, it is now well settled in the United States that a telephone company is a "telegraph company" within the meaning of those words, where found in a statute, and it cannot refuse its instruments and the use of its lines to persons desiring them.

Sleeping car companies are not common carriers, but they are public agencies and subject to public regulation, and bound to treat all persons without discrimination. But in matters of baggage or valuables they are not common carriers, or subject to insurance liability. Efforts have been made repeatedly to fix upon sleeping car companies all the liabilities of innkeepers, and there have been decisions both ways; but Prof. Lawson concludes that "according to the weight of authority the liability of a sleeping car company is not that of an innkeeper, but its duty in this respect is simply to protect the property of the passenger, and for any neglect of this duty, it will be responsible."

We have given briefly and imperfectly the plan and scope of this work. For the lawyer it is a valuable handbook in which the principles are conveniently gathered and which abounds in references to cases for fuller reading. The railroad officer who is not a lawyer will find in it the whole body of the law of bailments summed up in language that he can read without distress, and so well arranged that he can easily find the points that he wants. While it will probably always be true that the layman who is his own lawyer has a fool for a client, a good grasp of the fundamentals of the law of his business is almost necessary for the railroad officer of the rank of Division Superintendent or higher.

The World's Railway: Historical, Descriptive and Illustrative. By J. G. Pangborn. New York: Winchell Printing Company.

It occurred to a great many people who saw the remarkable collections illustrative of railroad history and railroad practice which were gathered at the World's Fair at Chicago that it would be a distinct loss of labor if these collections were dissipated at the end of the Fair. Fortunately, a few men of energy and liberality not only had this idea, but took prompt and effective means to keep much of the most valuable of that which was shown together in a permanent collection. The outgrowth of this effort was the establishment of the Museum of the World's Railway which is a part of the Field Columbian Museum now existing at Chicago. The name of Mr. Marshall Field has been connected with this museum in proper recognition of his munificence which made the museum possible. In the railroad museum are preserved the exhibits prepared by the Baltimore & Ohio, the Pennsylvania, the New York Central, the Chicago & North Western and the Illinois Central. Of these the Baltimore & Ohio exhibit was much the largest and, we may properly say, the most interesting and important, for its scope was not limited to the one railroad company. It gave a historical view of the evolution of the railroad. The Pennsylvania exhibit was also extremely valuable as a historical showing of the growth of the Pennsylvania system.

Another method of preserving and making available to future generations the results of the great labor of Major Pangborn and his fellow workers in making the Baltimore & Ohio collection is the publication of the volume, advance sheets of which are now before us. This is a rapid historical review of the development of the motive power and the permanent way of the railroad. It begins with the suggestions as to the possibilities of the use of steam made by Sir Isaac Newton, and then it brings us down the line, telling us of the work of Papin in the last third of the seventeenth century, of Watt and of Oliver Evans a century later, of Trevithick, of George Stephenson and of other great workers and investigators in the early years of this century. After about 1830 the men who applied great talent and energy to the development of the railroad became so numerous that we cannot even attempt in this short notice to mention any of their names; it is a long and honorable list.

Major Pangborn's scheme in preparing this work has been to make a compact chronology of the art. Much the greater part of the work is devoted to the earlier periods of evolution and progress. "The effort has been to narrate rather than to exploit, and to tell the story simply and plainly without thought of literary embellishment and entirely devoid of bias in favor of anyone. . . . The facts are given as the chronology is maintained, and from them conclusions may be drawn as the reader believes justified." As the narrative proceeds instructive illustrations are introduced. There are engravings of locomotives, beginning with the "Newton," of 1680, and ending with the Baltimore & Ohio "Director General," of 1893. There are also numerous engravings of track, beginning with the single wooden rail of 1676, and ending with a vignette showing standard track of 1893, with a track tank. There are also a good many portraits of the pioneers, among whom naturally and properly such Americans as Oliver Evans, Peter Cooper, James Milholland and William Mason have a place.

The volume has 164 pages, and if we began to describe its contents more minutely it would be difficult to know where to stop. It is enough to say that the author's scheme of presenting simple facts and refraining from comment has permitted him to gather into these pages a great amount of information. The book is quarto size, the pages being 11 × 14 in., and the letterpress 5¾ × 8 in. A great many of the illustrations are inserted in the broad margins, and the engravings of the locomotives are printed in several tints. This edition is on heavy plate paper and is a beautiful example of bookmaking. Another quite limited edition will be upon old imperial, Japanese, hand-made vellum, bound in full morocco.

Owing to Major Pangborn's long stay in Siberia, where he was for many months beyond mail communication, the completion of the work has been greatly delayed. The preparation of the index is now complete and the work will be issued within 60 days. Major Pangborn arrived in America on the fourth of this month and will sail again on the 29th, going now to Russia. He stays only long enough to give the last touches to this book. Doubtless the reader knows that his present business is as President of the World's Transportation Commission of the Field Museum. It is the business of this Commission to visit pretty nearly all the countries of the earth, collecting material for the museum. The Commission left America in the autumn of 1894, and it was expected that its tour would be finished in about two years and a half. Mr. Pangborn now returns to Russia to take up again the work which was interrupted by his brief visit to the United States.

Absorption of Woodiline by Oak Ties.

On Thursday, April 2, a number of experiments were made at Pavonia, N. J., at the tank recently built there by the Pennsylvania Railroad, to determine the quantity of woodiline absorbed by white and black oak ties, in varying lengths of time. Fifteen black oak ties were used, which had been left for two weeks in the room containing the boiler which supplies steam for heating the liquid in the tank. For the last five days of this time the temperature of the room ranged from 100 to 115 deg. Four white oak ties were also treated, these ties having been lying in the rain for two days, and being consequently rather wet.

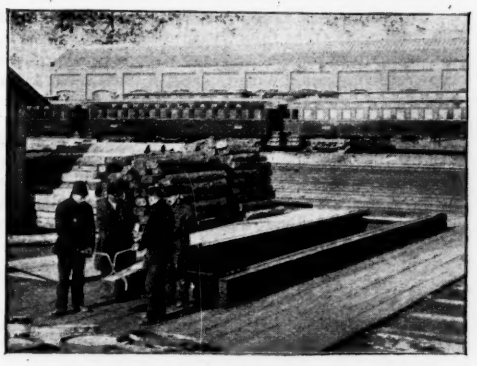
The ties were weighed before and after treatment, the difference in weight showing the amount of preservative absorbed. The temperature of the liquid was taken at frequent intervals, as shown in the table:

Number of tie.	Temperature of liquid.	Weight of tie, lbs.	Time of immersion, minutes.	Quantity of preservative absorbed in lbs.
2	120°	175	6	6
3	121°	173	10	4
4	122°	207.5	7½	5
5	123°	130	10	4½
6	125°	181	7½	3½
7	126°	204	10	4
8	128°	249	15	4
9	131°	202	15	2
10	134°	183	10	2
11	135°	207	10	4
12	136°	243	30	5½
13	137°	204	5	2
14	137°	227	5	6
15	138°	179	7½	6
Average..	129°	197	10.6	4.18 lbs.
		Average in gallons.....		.55

The figure .55 results from the fact that one gallon of the preservative weighs 7½ lbs. This average absorption of about half a gallon in 10.6 minutes is perhaps a little higher than would have been the case had the ties not been artificially dried. The American Wood Preserving Company, makers of Woodiline, have concluded from

tests extending over 13 years that half a gallon is sufficient to preserve an ordinary sized black oak tie from decay. With a higher temperature of the liquid in the tank a quicker absorption of the preservative would result.

Tie No. 1 was not included in the table. It weighed 207½ lbs. before treating and gained 10½ lbs. in three hours. This shows the penetrating power of the liquid.



Experiments with white oak ties were made as follows: Four white oak ties were taken from a pile where they had been lying in the rain for two days. Their absorption was good considering their wet condition.

Number of tie.	Temperature of liquid.	Weight of tie, lbs.	Time of immersion, minutes.	Quantity of preservative absorbed in lbs.
1	148°	209	14	2.5
2	148½°	198	12½	1.0
3	149°	177	17	4.0
4	149°	211	16	6.0
Average..	148.8°	198.7	14.8	3.4

Railroad Matters in England.

The Light Railway Bill.—Since I last wrote, the Light Railway Bill has been read a second time in the House of Commons and referred to the Grand Committee on Trade, consisting of about 70 members, who will meet after Easter to consider it in detail. The most significant feature in the debate on the second reading, which was quite short, was that a motion to strike out from the bill the principle of state aid was negatived without a division. From what has been said and written in Parliament and elsewhere it is clear that the proposal to withdraw the control of those schemes from Parliament and entrust it to the new Light Railway Commission with an appeal to the Board of Trade will not be seriously opposed.

The bill provides that railways which receive State assistance may be exempted from the obligation to pay local rates. An attempt will be made to extend this exemption to include all light railways. Further, an attempt will no doubt be made to exempt them from the existing passenger duty of five per cent. on all fares at a rate higher than one penny per mile.

The Government will in all probability have to make a concession as to the rate of interest to be charged on loans from the Treasury, which it is proposed in the bill to fix at 3½ per cent. Considering that the Government can itself borrow money at about 2¼ per cent., this rate is certainly excessive. But whether it will merely be reduced to a lower figure, or whether the Treasury will be required instead of granting loans ranking in front of the shareholders subscriptions to take ordinary shares and so run the same risk as private subscribers, remains to be seen.

Agricultural Rates.—The great railway companies are still pressing on reductions in their charges for the carriage of agricultural produce. Hardly a day passes in which the newspapers do not contain notices, either that the company has reduced its rates, or is about to reduce them, or lastly, has been investigating the question, and finds that its rates are so much below those charged by its neighbors even after reduction that it is unable to concede any further reductions. The South Western Railway has recently published some figures which may be interesting, as showing what are regarded in this country as reasonable rates for the conveyance of meat.

Distance. Miles.	Old rate. s. d.	New rates. Small consignments. s. d.	New rates. Two-ton truck loads. s. d.
131½	43 4	38 4	29 2
144	48 4	40 10	31 8
150	48 4	40 10	31 8
155	50 0	41 8	31 8
159	50 0	41 8	31 8
193	53 6	48 4	37 6
197	54 2	49 2	37 11
218	57 6	53 4	41 8
189	53 6	47 6	36 8

All these rates include delivery in London, worth probably about 7s. per ton in the case of small consignments or 5s. per ton in the case of 2-ton lots.

A new company entitled the British Produce Supply Association, registered as a trading company though not intended to work for profit, has just been started. The Association proposes to purchase from the farmers in such quantities as they may have to sell dairy produce, meat, etc., at the local markets, to consign in wholesale quantities to London and other great consuming centers, and then to dispose of the produce either through the existing market salesmen or by opening retail shops of their own as may hereafter be found most convenient. It is hoped, we are told, that the agent purchasing for the Association will help to educate the farmers into producing articles of the quality required in the great markets, both by his action in purchasing certain articles and refusing certain others, explaining in each case his reasons for the course adopted, and also by distributing printed papers showing what are the requirements of the Association and its customers and how they may best be met. An outsider may be permitted the reflection that the man who can educate the British farmer must be possessed of a genius which Pestalozzi might have envied.

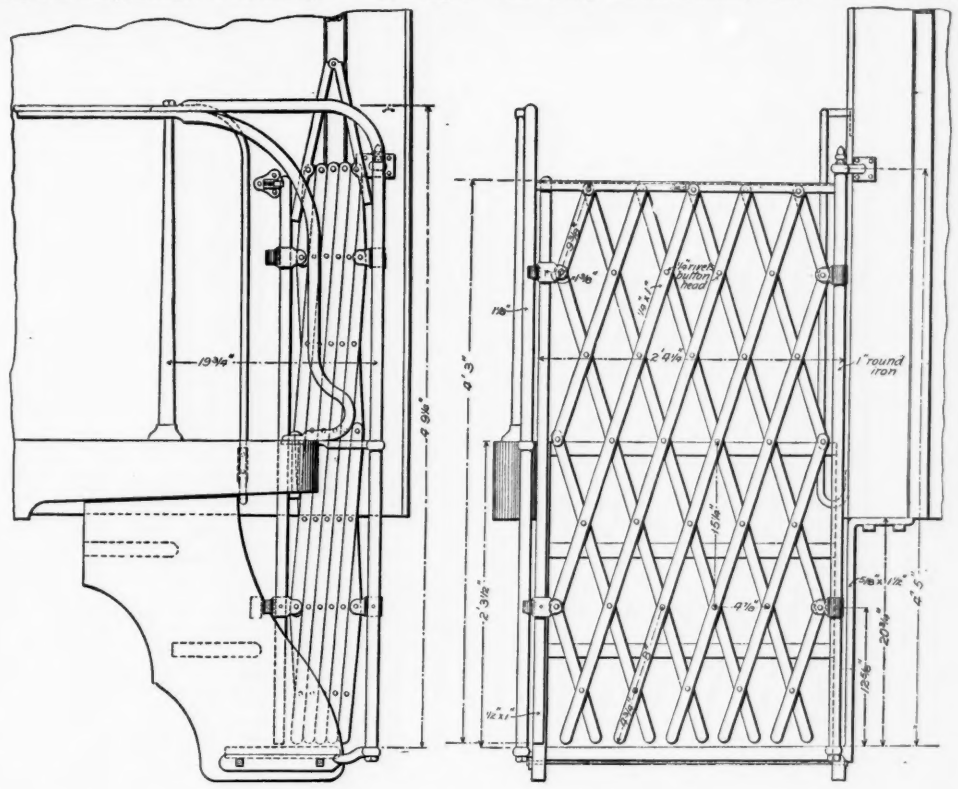
Accident at Little Bytham.—The Great Northern Railway, long and justly regarded as one of the most perfect in the country, a line on which no price has ever been thought too high to be paid for safety, has once more been the scene of a serious and fatal accident due to the failure of the permanent way. On the evening of March 7, as the up express from Leeds was running down at long incline at its accustomed speed of about 70 miles an hour, the two rear coaches suddenly left the rails near Little Bytham station, 92 miles from London. Two passengers were killed and six persons injured. The front carriage of the two derailed was dashed against the parapet of a bridge, and the body almost entirely destroyed. Its frame remained attached to the train and was dragged along with one passenger who, strange to say, escaped uninjured, still seated on it. The last coach went through the bridge into the road, 30 ft. below, and ran up the embankment on the further side. The report of the Board of Trade inquiry has not yet been issued, but from the evidence given before the Coroner there can be no doubt that the accident was due to the displacement of the road. In consequence of the St. Neots accident, of which I spoke in my last letter, a good deal of the line was being relaid with new rails. At Little Bytham in particular the work of relaying had been finished five days before, but the top ballast had not been replaced. Until the Saturday morning trains had been running at reduced speed, but about midday it was thought safe to withdraw the restrictions. Between that hour and 7:46 p. m., when the accident happened, 30 trains, 8 being fast expresses and the remainder mostly coal trains passed over the line at full speed. The engineer of the railway company believes that the last of the coal trains must have slightly displaced the road and then that the heavy engine of the Leeds express spread it still further. It is probable that a storm of rain on the Friday and Saturday had something to do with the occurrence, which, after all, remains in great measure inexplicable.

Passenger Fares.—The Great Western and the London & South Western, which between them carry all the traffic from London to the southwest of England, have given notice that at an early date they will revise their fares for 1st and 2d class passengers so as to bring them within a maximum of twopence 1st class and a penny farthing, 2d, per mile. At present the 1st class fares range from about 2d. to 2¾d. averaging probably 2¼d., while the 2d class vary between 1½d. and 2d., averaging probably something under 1¾d. That the reduction will be a benefit to 1st and 2d class passengers goes without saying. Whether they will induce any considerable number of passengers to desert the almost universal 3d class for the sake of greater comfort and less mixed company is much more questionable.

Manchester Ship Canal.—The traffic on the Manchester Ship Canal is increasing steadily but somewhat slowly. So far the net receipts fall a long way short of covering the interest on the company's debt, while a dividend to the shareholders seems out of the question for a generation to come. Among its other obligations the company owes nearly five millions sterling to the City of Manchester, and as it has no prospect of being able to meet the liability, the citizens of Manchester will have to find the interest themselves, and a very heavy addition to the municipal rates will in consequence have to be made. I read some time back in the *Railroad Gazette* a letter from an English engineer stating that, though the ship canal had not paid directly, it had indirectly given to the district very good value for the money spent in the shape of reductions in rates on the railways between Liverpool and Manchester. This led me to make inquiry, and the goods manager of one of the railway companies concerned writes to me: "There has practically been no reduction in the rates between Liverpool and Manchester on account of the opening of the Manchester Ship Canal." How long this statement will continue true no one of course can say. At the present moment the canal management are applying to the Railway Commission to compel the railway companies to give combined railway and canal through rates between Eastham at the mouth of the canal and inland towns beyond Manchester. The case which comes on for trial next month will raise points of great interest both legally and economically, and, if it succeeds, doubtless the canal trade will get a lift. At present one can only say that, though the new waterway is undoubtedly becoming a factor in the traffic of the Manchester district, nothing like the revolution that its projectors looked for has been wrought by its opening.

I must correct a small mistake in my last letter. There are six trains, not five, which run between London and Bath without stopping. The result is to make the total number of trains 35, the average length of run 113 miles, and the average speed 51 2 miles per hour.

LONDON, March 27, 1896. W. M. ACWORTH.



Gate for Passenger Cars on the Southern Pacific (Atlantic System).

Southern Pacific Passenger Car Gate.

The management of the Southern Pacific in Texas have lately adopted a rule requiring passengers to show their tickets before entering the cars, similar to that which has been in vogue on the Chicago & Alton for two or three years past; and most of the passenger cars are now being fitted with gates. This gate differs from the Wood and other gates in common use in that it extends to the lower step, thus more completely closing the entrance to the car platform. The gate is collapsable, and we show herewith end and side elevations and a plan. The end elevation shows the gate collapsed and the passageway open; the side elevation shows the gate expanded and the passageway closed.

The Mineral and Metal Production of the United States in 1895.

We have received from Mr. R. P. Rothwell, Editor of the *Engineering and Mining Journal*, a table which is printed in this issue giving the mineral production of the United States in 1894 and 1895. These statistics were collected for the fourth annual volume of "Mineral Industry; Its Statistics, Technology and Trade," which will shortly appear. These yearly volumes are believed to be the most comprehensive and accurate statistics of our mineral production that have ever been published, and they are used officially by the British, French and some other European governments. The production of the United States in 1895, as shown by these tables, is the largest in the history of this or any other country. The total value of these productions amounted to almost 674 million dollars, but the editor warns us that certain deductions must be made for articles that have been duplicated necessarily in the table, as, for instance, iron ore used in making pig iron. He estimates the amount of these deductions at about 45 million dollars in 1895.

MINERAL PRODUCTION OF THE UNITED STATES IN 1894–95.

Compiled for THE MINERAL INDUSTRY, Vol. IV.,

By Richard P. Rothwell, editor of the *Engineering and Mining Journal*.

No.	Products.	Customary Measures.	1894. Quantity. Customary Measures.	1894. Quantity. Metric Tons.	1894. Value at Place of Production.	1895. Quantity. Customary Measures.	1895. Quantity. Metric Tons.	1895. Value at Place of Production.
	NON-METALLIC.							
	Abrasives—							
1	Corundum and emery	Short tons	1,120	1,106	$109,500	385	349	$56,400
2	Garnet	Short tons	1,000	907	35,000	2,065	1,873	93,350
3	Grindstones	Short tons	29,989	27,200	257,596	36,389	33,004	290,378
4	Millstones	Short tons	297	269	4,447	105	95	8,525
5	Tripoli and infus. earth	Short tons	1,663	1,508	22,825	1,788	1,622	26,049
6	Whetstones	Short tons	1,735	1,574	84,450	1,609	1,459	78,308
7	Alum	Short tons	72,000	65,304	2,160,000	75,000	68,025	2,225,000
8	Antimony ore	Short tons	165	150	9,075	1,083	982	37,905
	Asbestos and talc—							
9	Asbestos	Short tons	265	240	4,350	1,010	916	11,400
10	Fibrous talc	Short tons	50,500	45,804	505,000	66,500	60,316	665,000
11	Talc and soapstone	Short tons	21,044	19,087	401,892	18,885	17,129	361,353
12	Asphalt	Short tons	4,198	4,080	75,654	14,300	12,970	300,000
13	Bituminous rock	Short tons	34,199	31,018	148,120	43,778	39,707	143,456
14	Barytes	Short tons	23,758	21,548	95,032	20,255	18,371	99,020
15	Bauxite	Long tons	10,732	10,908	42,928	14,145	14,371	56,580
16	Borax	Pounds	12,140,584	5,962	919,841	13,506,356	6,126	742,850
17	Bromine	Pounds	379,444	172	98,655	394,854	179	102,662
18	Cement, natural hydraulic	Bbls., 300 lbs	7,813,766	1,064,297	4,455,928	7,694,053	1,047,006	4,597,285
19	Cement, Portland	Bbls., 400 lbs	611,229	110,877	1,209,446	749,059	135,879	1,430,089
20	Clay, refractory	Short tons	3,375,798	3,061,794	4,050,885	*b*3,750,000	3,401,250	4,500,000
21	Clay, kaolin	Short tons	24,552	22,346	185,160	30,910	28,035	258,431
22	Coal, anthracite	Short tons	*a*52,010,433	47,183,345	80,879,404	*a*58,362,985	52,965,538	89,948,699
23	Coal, bituminous	Short tons	*a*117,865,348	106,903,871	103,758,967	*a*138,079,466	125,247,053	125,489,488
24	Coke	Short tons	8,495,295	7,706,846	12,654,558	9,927,348	9,006,090	15,258,935
25	Cobalt oxide	Pounds	6,550	3	8,843	6,400	3	8,640
26	Copperas	Short tons	14,807	13,511	104,160	14,118	12,805	69,846
27	Copper sulphate	Pounds	*b*60,000,000	27,215	2,016,000	45,000,000	20,412	1,350,000
28	Chrome ore	Long tons	2,653	2,697	35,125			
29	Feldspar	Long tons	18,704	19,009	83,465	22,195	22,550	104,082
30	Fluorspar	Short tons	6,400	5,805	58,304	4,000	3,628	36,440
31	Graphite	Pounds	770,846	349	34,689	392,008	178	17,640
32	Graphite, amorphous	Short tons	165	150	1,252	1,100	998	4,700
33	Gypsum	Short tons	301,536	273,493	910,891	298,572	270,804	974,219
34	Iron ore	Long tons	11,880,000	12,070,080	20,790,000	16,950,000	17,221,200	29,662,500
35	Lime	Bbls., 200 lbs	*b*55,750,000	5,148,320	28,375,000	*b*60,000,000	5,443,164	30,000,000
36	Magnesite	Short tons	1,370	1,243	7,864	2,200	1,995	14,700
37	Manganese ore	Long tons	11,735	11,924	74,890	14,883	15,121	92,044
38	Mica, ground	Pounds	829,500	377	35,957	750,000	340	31,956
39	Mica, sheet	Pounds	9,900	4	11,103	6,200	3	6,400
40	Mineral wool	Pounds	5,776	5,239	58,936	6,742	6,115	69,481
41	Monazite	Pounds	750,000	340	45,000	1,900,000	862	114,000
42	Natural gas				13,000,000			12,000,000
43	Paints, mineral	Short tons	47,593	43,167	1,011,182	47,084	42,705	1,086,767
44	Paints, vermilion	Short tons	91	83	111,209	118	107	118,190
45	Paints, white lead	Short tons	87,242	78,155	8,445,174	92,000	83,462	8,740,000
46	Paints, zinc oxide	Short tons	22,814	20,697	1,711,275	22,600	20,498	1,588,300
47	Petroleum (crude)	Bbls., 42 gals	48,537,396	6,158,119	40,762,962	50,852,025	6,420,742	42,547,701
48	Phosphate rock	Long tons	952,155	967,485	2,856,465	831,498	844,802	2,577,643
49	Marls	Long tons	225,000	228,622	607,500	217,700	221,183	587,790
50	Precious stones				150,000			150,000
51	Pyrites	Long tons	107,462	109,192	466,466	81,000	82,296	353,560
52	Salt, evaporated	Bbls., 280 lbs	11,798,659	1,498,193	5,586,326	12,521,498	1,539,178	5,844,348
53	Salt, rock	Bbls., 280 lbs	2,341,922	297,376	784,063	1,367,638	173,662	518,740
54	Silica, sand and quartz	Long tons	477,670	485,313	418,612	523,640	532,018	553,128
55	Slate, roofing	Squares	611,776	180,474	2,007,321	645,361	190,277	2,062,239
56	Slate, other manufactures	Square feet	4,395,125	12,966	399,758	3,786,599	11,170	369,062
57	Stone, limestone (flux)	Long tons	3,544,398	3,601,459	2,126,636	3,390,000	3,444,240	2,542,500
58	Stone, marble	Cubic feet	6,331,279	518,532	3,576,853	6,942,533	568,593	4,096,261
59	Stone, onyx	Cubic feet	1,450	110	29,000	800	66	10,750
60	Sulphur	Long tons	441	488	7,056	12,000	12,192	192,000
61	Other building stones				630,000,000			33,000,000
	Total non-metals				378,877,939			428,266,385
	METALS.							
62	Aluminum	Pounds	817,600	371	490,560	900,000	408	495,000
63	Antimony	Short tons	220	205	39,200	433	393	68,847
64	Copper	Pounds	353,504,314	160,392	33,540,489	386,453,850	175,294	36,944,988
65	Gold	Troy ounces	1,923,619	*c*59,824	39,761,205	2,265,612	*c*70,470	46,830,200
66	Iron, pig	Long tons	6,657,388	6,764,572	71,966,364	9,446,308	9,597,449	108,632,542
67	Lead, value at New York	Short tons	160,867	145,906	10,585,048	156,854	142,298	10,132,768
68	Quicksilver	Flasks, 76½ lbs	30,440	1,056	1,095,840	33,978	1,179	1,313,589
69	Silver, commercial value	Troy ounces	49,846,875	*c*1,550,387	31,403,531	46,331,235	*c*1,441,087	30,254,296
70	Zinc spelter	Short tons	74,004	67,135	5,309,882	81,858	74,245	5,942,890
	Total metals				194,092,119			240,615,120
	Est. products unspecified				5,500,000			5,000,000
	Grand total				578,470,058			673,881,505

(*a*) Bituminous coal includes brown coal and lignite. The anthracite production is the total for Pennsylvania, Arkansas, and Colorado. (*b*) Estimated. (*c*) Kilograms.

Foreign Railroad Notes.

The Russian railroads have been working over the rates on wood and timber, which form an important part of their traffic, from which they earned in 1893 nearly $5,600,000 (on about 18,000 miles of railroad), the weight of this freight amounting to about 2,800,000 tons. The difference between the circumstances here and there is indicated by the fact that in Russia only 8,200 tons of lumber were carried more than 800 versts (532 miles) and only 171,000 tons more than 200 miles. Nearly twice as much fire-wood as timber is carried, and 157,000 tons of it moved more than 200 miles. Russia has immense forests, but also immense treeless plains—something like this country; and a great part of its forests are where there are no railroads.

At the beginning of this year, 58 per cent. of the Russian freight cars had had their capacity increased to 27,000 lbs. Recently the standard was about 22,000.

The Russian State Railroads during the summer season last year made a special tariff for suburban traffic on the following basis. Round trip tickets, 25 per cent. less than the regular fares; subscription tickets, 20 at a time, 40 per cent. reduction; tickets good for one month, at the price of 20 round trip tickets; for the "season" (length o time not reported) at the price of 3½ monthly tickets, and for the whole year at the price of six monthly tickets, which would amount to the cost of 180 full price tickets one way. This winter it has been determined to modify this plan and make it permanent, as follows: There will be no longer any reduction for round trip tickets for distances of 33 miles and less, and but a very small one for greater distances: for single tickets the rate is reduced from 1.44 to 1 kopeck per verst (the latter about ¾ cent per mile, doubtless third-class); the other rates will remain unchanged, but "subscription" rates will be accepted for 10 tickets as well as 20.

The Russian railroads have set about encouraging the spread of knowledge by an enormous reduction in the rates on books, school supplies, and the like. For short distances the reduction is more than one-half, and for very long ones much greater. For instance, you can now send a pood (36 lbs.) of books from St. Petersburg to Vladikaukaz, 1,600 miles by passenger or mixed trains for about 48 cents, while the old rate was $1.93.

The Russian petroleum trade was badly injured last winter by inundations which interrupted for weeks the working of the Transcaucasian Railroad, which extends from the petroleum wells on the Caspian to the Black Sea, through what were formerly known as Circassia and Georgia. There is now serious talk of a pipe line to connect with a railroad north of the Caucausus.

Though a considerable part of the Siberian Railroad has been completed and used for construction trains a long time it has not been open for traffic and will not be until next July, when, a Moscow paper says, an express train will begin running between Moscow and Omsk at the rate of 16½ miles an hour (which will enable the passengers to see the country). The part of this route which is over the Siberian Railroad is 467 miles long, but it is several hundred miles from Moscow to the western terminus of that road. On that line the stations average 26 miles apart. The government list of stations shows the line to Ob, 380 miles beyond Omsk, and on the eastern (Pacific) end from Vladivostock northeast to Iman, 258 miles. Besides, there is a connecting line from the western terminus northwest 154 miles to Jekaterinenburg, the eastern terminus of a mining railroad over the Ural, which was the first railroad built into Siberia, and has no rail connection with the rest of Russia but a river outlet.

The result of the new Russian passenger tariff is indicated by the fact that in 1895 the passenger earnings increased from 50 to 58 millions of roubles—16 per cent. The fares per mile decrease rapidly with the distance, and the figures indicate a great increase in the longer journeys. For the longest routes the fares are now only about one-fourth of what they were by the old tariff.

Later definite reports of the new mileage opened in Russia in 1895 (not including the Siberian Railroad), shows it to have been 550 miles, and the total Russian mileage at the end of the year (excluding Asiatic Russia and Finland) was 21,366 miles, of which 4,924 miles is double-track railroad. More than 2,000 miles were taken into the State system in 1895, which now has 63½ per cent. of the whole. A great deal of railroad work was done last year on lines not yet open, and these and the lines whose construction was resolved upon that year amount to about 8,230 miles—including the Siberian Railroad.

The northernmost railroad in the world, which extends to about latitude 64 deg., inside of the Arctic circle, is in Sweden, and serves for carrying iron ore from Gellivara southeast to the Gulf of Bothnia, at Lulea. Originally it was isolated, but in the summer of 1894, a Swedish main line, which extends nearly parallel with the west coast of the Gulf of Bothnia, was extended to a junction with it, so that now one may travel by rail from Stockholm into the Arctic zone. The main line is now to be extended around the head of the Gulf of Bothnia to the border of Finland at Haparanda, and a Finnish railroad on the east side of the gulf is also to be extended to Tornea, opposite Haparanda, when it will be possible to go by rail from Stockholm to St. Petersburg, going completely around the gulf.

In answer to an inquiry made in the German Imperial Diet concerning the introduction of Sunday rest on the Imperial railroads (those of Alsace-Lorraine), the Minister of Public Works replied that Sunday rest so far as freight traffic is concerned is generally established on those lines. The only freight train running that day was a through train from Belgium to Basle. It was intended to adhere to this practice, though in times of an unusual pressure of traffic and scarcity of cars exceptions might be made. On the Prussian State Railroads, where a similar policy had been introduced, a part of the freight trains had to be run Sunday during September and October. Of the office employees 80.8 per cent. had had a whole holiday Sundays and 14 per cent. a half-holiday. Of the station force, 33½ per cent. had had the whole day and 15 per cent. half of it; of the trainmen, 42½ per cent. had the whole day and 7.6 per cent. half; of the trackmen, 41¾ per cent. the whole and 4⅜ half; of the telegraph and shop hands, 79 per cent. the whole and 3 per cent. half. Those employees who had to work on Sunday were given time to attend church.

TECHNICAL.

Manufacturing and Business.

The Hall Signal Company's New York offices are now in the Edison Building, No. 44 Broad street, instead of at No. 80 Broadway, as heretofore.

The Lebanon Rolling Mills, which have been idle for some time, resumed operations in all departments on Monday last, employing 250 hands.

Officials of the Pennsylvania Steel Co. report the business of that company in a favorable condition. The company recently secured the contract for supplying th West End Street Railway of Boston with steel rails for the entire year of 1896. The contract is said to involve an expenditure of $350,000 on the part of the West End Company. The Pennsylvania Company has other large orders, which will keep the works running full time for some time to come.

J. A. Fay & Co., and the Egan Co., the wood-working machinery manufacturers, of Cincinnati, recently sent joint representatives to Australia and South Africa to look after their interests in those countries, and more recently sent a representative to Japan. He sailed from San Francisco on Feb. 6, and the vessel not having been heard from for nearly two months was given up for lost. A letter, however, has just been received stating that the vessel will arrive at Yokohoma 20 days late, a storm having compelled the ship when about 1,200 miles from Japan, to turn back on her course to Honolulu.

The Dauphin Bridge Company, of Philadelphia, has been granted a charter, and remodled the plant of the old Dauphin Car Works, at Dauphin, Pa., which has also been enlarged. The capital stock is $50,000, and the incorporators, Henry R. Leonard, Peter R. Foley, Walter C. Ritner, Charles B. Colby and Henry H. Colby It is said a number of orders have already been secured.

The King Bridge Co. announces that after May 1 its

New York office will be at 501 Fifth avenue, instead of at 18 Broadway.

The Ellwood Weldless Tube Company will soon erect a plant at Elwood City, Pa., and, it is said, will employ about 1,000 workmen.

Iron and Steel.

The Pittsburgh Forge & Iron Company, of Pittsburgh, Pa., is contemplating the erection of a large steel plant at Wood's Run, Allegheny, Pa., to be operated in connection with its present large establishment.

The Ellis & Lessig Steel & Iron Company of Pottstown, Pa., has increased the wages of its employees 10 per cent.

The Phœnix Bridge Company has been awarded the contract for the steel walk along the beach front at Atlantic City, its bid of $120,000 being the lowest submitted. Work is to be begun within five days after the contract is awarded, and is to be completed in eighty days under a penalty of $200 per day for each day thereafter that the work is unfinished.

It is said that the Durham Furnace at Bingen, Pa, which has been shut down for about three years will be started again about May 1.

The plant of the Oxford Iron & Nail Company, at Oxford, N. J., has been sold to E. R. Holden, Vice-President of the Delaware, Lackawanna & Western Railroad, for $70,000. The plant is said to have originally cost about $800,000.

New Stations and Shops.

The South Florida road has just completed an addition to the machine shops at Sanford, Fla., and a number of new machines have been placed in this department. It is stated that additional wood-working machines will be ordered for these shops in a short time.

The erection of new machine and wheel shops of the Atchison, Topeka & Santa Fe, at Argentine, Kan., will probably be commenced early this month. The new shops will about 80 ft. × 200 ft. The plans for the buildings were completed last fall. Considerable new machinery will be ordered for these shops, including a wheel boring-machine, axle lathe, wheel press and wood working machinery.

Interlocking.

The National Switch & Signal Company has taken the contract for interlocking signals at the crossing of the Peoria & Pekin Union with the Peoria Terminal, which is a double track line of the Rock Island road; also the drawbridge crossing the Illinois River, which is to be operated and controlled from the tower at this crossing. The National also has the contract for installing a plant for the double tracked junction of the Peoria & Pekin Union with the Lake Erie & Western, known as the L. E. & W. Junction, about a mile east of the Illinois River at Peoria. The drawbridge is crossed by a gantlet and electrical interlocking will be applied on the drawbridge so that the presence of a pair of wheels between the ends of bridge will lock up the engine that swings the bridge as well as the levers controlling the signals from both directions.

The Reading Subway, Philadelphia.

At last advertisements are made for bids on the great work in Philadelphia known as the Reading Subway Scheme, which will cost $5,000,000 or $6,000,000, and will do away with 17 street crossings at grade. Sealed proposals must be sent to Mr. T. M. Thompson, Director Department of Public Works, before 12 o'clock noon on May 12, 1896. The following classes of work are included:

Subway and tunnel (built in open cut) including ventilating conduits, retaining walls, bridges, etc.
Temporary and permanent tracks, with interlocking signals.
Retaining walls, the reconstruction and underpinning of buildings and other work.
Freight and engine houses and repair shop.
Commercial coal conveyor and locomotive coaling station.
Hydraulic lift and electric crane.

Proposals must be accompanied by a certificate that a bond has been filed in the Department of Law, as directed by ordinance May 25, 1860; also by a certified check for a sum not less than 2 per cent. of the work proposed for. The bids will be prepared on the basis of the Engineer's approximate estimate of quantities, which are incorporated in the specifications. Plans, specifications and form of proposal may be examined at the Bureau of Surveys, room 536, City Hall. Copies may be procured upon depositing a certified check, drawn to the order of the Chief Engineer, for an amount dependent upon the number of plans and specifications desired, as a guarantee of their return in good condition. A fuller description of the work appears in another column.

Rail Joints.

The Chicago & Northwestern Railway Co., after seven years test, have ordered through H. H. McDuffee, General Sales Agent, 13,000 truss rail joints for their new double track of 36 miles on the Madison Division, to be laid with 80-lb. steel.

The Metric System.

Last week, page 251, we gave a brief synopsis of the bill introduced in Congress to bring about the use of the metric system. On the question of ordering the bill to a third reading a favorable vote was obtained of 119 to 116. This was then reconsidered and by a vote of 143 to 99 the bill was sent back to the committee. This, we suppose, kills the matter for this session.

Accident to the Halstead Street Lift Bridge, Chicago.

A short time ago an accident happened to the Halstead street lift bridge in Chicago, which serves to emphasize the need of thorough and competent inspection of the materials used in the construction of such works. The bridge is over the south branch of the Chicago River and was designed by Mr. J. A. L. Waddell, of Kansas City. It was erected by the Pittsburgh Bridge Company, the Crane Elevator Company having the subcontract for the elevators or lifting machinery. A complete description of this bridge is in the *Railroad Gazette*, page 143, 1893.

The accident in question consisted in the falling of a portion of one of the four counter weights which are attached to the corners of the bridge. Each of these counter weights weighs 137,500 lbs., and is divided into four portions which consist of cast-iron weights held by two iron rods 1⅛ in. in diameter. These rods are attached to the lifting cables. One of these rods broke while the bridge was being raised, thus throwing all the weight on the remaining rod, which then broke and allowed the weight to fall about 150 ft., nearly the height of the lift. The guides were somewhat damaged, and the flooring beneath was destroyed, the weights burying themselves in the bottom of the river.

An examination of the rod that was first broken showed that at the place where the fracture occurred the rod was defective for at least three-quarters of its section and showed also that it had been made from extremely poor stock. The lifting machinery, etc., had been inspected by an inspector employed by the city. There can be no blame attributed to the design as it was fully strong enough to carry the weight, the cause of the accident being the poor material used.

Manchester Ship Canal.

The Engineer to the corporation of Manchester, Mr. G. H. Hill, has recently made a report on the present condition of the Manchester Ship Canal. He says that this year the full cost of maintenance and dredging will be charged against revenue, and that the cost of dredging will be from £50,000 to £57,000. Moreover, the interest on the first and second mortgage debentures has to be met and a sum must be kept in hand for contingencies. The interest due to the corporation of Manchester will not be met, and a special tax rate of 1s. 2d. in the pound will be necessary to meet it this year. The accumulated interest due to the corporation of Manchester will, at the end of this year, have reached the total of £393,750. Furthermore, if trade continues to expand, further equipment will be necessary, "and, having in view the interest in arrears and the large amount the corporation has invested in the canal, it is clear that some step will have to be taken in the autumn, as the corporation will require to safeguard the amount it already has in the undertaking. The question will arise whether or no the corporation will advance more money to deal with the expansion of trade." The navigation has been singularly free from casualties, especially with large vessels, and with reasonable care the canal is safe for navigation. It is obvious that the shareholders cannot hope to see a return on their money, although it is barely possible that their heirs may get dividends. The taxpayers of Manchester also must by this time realize that they have spent a tremendous amount to secure the advantages of water competition.

THE SCRAP HEAP.

Notes.

Mr. Schmidt has introduced in the New York Legislature a bill requiring street railroads to provide shelter for passengers at transfer stations in Brooklyn.

A press dispatch from St. Louis states that Judge Caldwell, in the United States Circuit Court, has directed the Receiver of the Colorado Midland to continue in force a contract or agreement made by the company with the telegraph operators in 1892.

The Southern Pacific Company now requires passengers at all stations between Houston and New Orleans to show their tickets on entering the cars, gates having been provided at the car platforms and rules established similar to those in force on the Chicago & Alton. The gate used is described in another column of this paper.

The Baltimore & Potomac tunnel at Baltimore, Md., is to have 75 movable incandescent electric lights for the use of the track repairers. The company has just contracted with David E. Evans & Co., of Baltimore, to furnish the lights. They will be mounted on movable carriages connected with feed wires supported by cleats on the side of the tunnel.

John Kelly, of New York City, has been sentenced to four months' imprisonment for wantonly stopping a passenger train. While riding on the New York, New Haven & Hartford Railroad he lost his hat, and pulled the bell rope for the purpose of going back to get it; the conductor interfered with his plan, however, and he was compelled to go on without the hat; but his displeasure at being thus baffled was so strong that about 15 or 20 miles further along he stopped the train again, and, though he was watched, succeeded in doing the same thing a third time.

Library Hall, the elegant building occupied by the Young Men's Christian Association and the offices of the Westinghouse Air-Brake Company, at Wilmerding, Pa., was destroyed by fire on April 8. The total loss is about $60,000, mostly covered by insurance. This structure was built by the Westinghouse Air-Brake Company about six years ago and was intended for a clubhouse for the employees of the company, but this purpose was changed. The first floor was occupied by the Young Men's Christian Association, the second by the general offices of the Brake Company and the third by the drafting rooms. An officer of the company states that the house will be rebuilt at once.

New Ferryboats for the Pennsylvania.

The Pennsylvania Railroad Company has contracted with the Cramps and the Charles Hillman Shipbuilding Company for two twin-screw ferryboats, which will be run from Jersey City to Twenty-third street, New York. The boats will be double-decked and 206 ft. long with a beam of 65 ft., the same dimensions as the company's present boats, which have a speed of nine miles. The new ones, however, are expected to run 15 miles an hour, as the new engines will be more powerful. There will be two compound engines to each boat with cylinders of 20 in. and 32 in. diameter and 24 in. stroke. The boats will probably not be completed before next January.

Still Another Bridge Accident.

On last Monday a train consisting of a locomotive and two gravel cars broke through a trestle near Bedford, Ind., on the Bedford Belt Railway. The conductor, fireman and three others were instantly killed, and the engineer and another man injured beyond recovery. The trestle is about 75 ft. high.

Another Railroad in Peru.

The Lima (Peru) correspondent of the Panama *Star and Herald* says that the Senate has authorized the Government to make a contract for the construction of a railroad from Oroya to Chanchamayo, with a grant to the contractors of 70,000 acres of land. This road, when built, will be a most important one, opening communication between the coast and the great timber region. Propositions have been made by European capitalists for the construction of the road.

Boy Conductors.

The East Oakland Street Railroad, which covers the greater part of East Oakland, is the subject of considerable talk because of the fact that it employs boys in at least six instances to act as conductors. The boy who has the branch run from Broadway and Twelfth street is a wee fellow, scarcely 13 years of age, and said yesterday that he went on duty at noon and worked until 11 o'clock at night. His wages are $15 a month. There are five other little fellows on the road who work just as hard and receive the same wages. The men on the road receive 20 cents an hour, and for the 11 hours this mite of a conductor puts in a man would receive $2.20 or in the neighborhood of $60 per month. On each boy the company saves about $45 a month or $270 on the lot.—*San Francisco Chronicle.*

Cape Hatteras Lumber Traffic.

Possibly no other business connected with shipping has within the past three or four years undergone such a complete change as the shipment of lumber to this port from the Cape Hatteras districts. Until within this time lumber from that locality was brought here in schooners only, but they have been driven almost out of the trade by the introduction of the barge, which is towed down and back all the way through the inland waters and canals. Less than eight years ago there were over 100 sail of vessels of light draft engaged in the trade. To-day, although the receipts of lumber are far in excess of previous years, there are not over 10. Lumber from Hatteras now excludes from the market almost entirely the spruce and pine lumber that at one time was brought here in immense quantities from the New England States. The barges used in the North Carolina trade are lightly built and would not stand going to sea. They are nearly all constructed in Elkton, Md., and when new cost about $6,500. It takes only a captain and one man to run them and in most instances the former is the managing owner. They carry an average of 250,000 ft. of lumber each, at a freight rate of $3.50 per M. Out of this $2.50 is paid for tonnage there and back and 95 cents per M. for canalage and stevedoring.—*Philadelphia Press.*

Pullman Company Not Responsible for a Murder in a Sleeping Car.

The Virginia Supreme Court of Appeals has decided for the defendants in the case of D. D. Connell's executor vs. the Chesapeake & Ohio and Pullman Palace Car companies. Connell was shot in his berth on one of the defendants' sleeping cars, near Waynesborough, Va., on the night of Aug. 1, 1891. The assassin, it is supposed, slipped into the car, shot Connell down, and then hastily escaped. The wounded man was removed to Charlottesville, where he died. Both companies were sued for $10,000 damages, but the conclusion of the highest court is that Connell lost his life in a manner which the defendants could not have foreseen or provided against.

Train Robbing Not Profitable.

The record of train robberies published in the *Globe-Democrat* would indicate that the business is exceedingly unprofitable to those engaged in it. It appears that in eight cases, in which 22 men participated, only $840 was secured by the robbers, and this sum would not pay for their outfitting. Of the 22 men, all but one have been killed, executed, or sentenced to the penitentiary for from 7 to 45 years each, and two of them for life. Undoubtedly the last one will be captured or killed before many months. Capital punishment for such offenses should be made the law, or it should not be the law for any offense whatever.—*St. Louis Globe-Democrat.*

Admission of Apprentices and Mechanics to the Engineering Courses of Purdue University.

Purdue University offers courses in mechanical, civil and electrical engineering. All these courses include lines of work with which shopmen are often familiar, and for this reason such men may enter these courses under conditions which are greatly in their favor. Thus those who, as apprentices, have acquired skill in manipulation and have become acquainted with the principles of construction, can properly be excused from the shop work which other students are required to take; the experiences of the shop can in this way be made to count in advancing the student in his professional course. Or if it happens that an applicant is unprepared in some line of work required for admission, such deficiency need not prevent his admission, provided his credits in shop work are sufficient to give him time in which to bring up the required preparatory work. Each application for credit or for conditional admission will necessarily require individual consideration, and persons seeking such admission are advised to inform themselves by correspondence before going to the expense of applying in person. The tuition at Purdue for all residents of the State of Indiana is free. For non-residents the tuition is $100 a year. The trustees have, however, placed a considerable number of scholarships at the disposal of the President of the University to be bestowed upon worthy students at his discretion. The effect of a scholarship is to remit the tuition charge. Candidates for admission living outside the State of Indiana should send their requests to the President, Mr. James H. Smart, Lafayette, Ind.

Lake Iron Ore Notes.

As a result of the late reduction in the Bessemer pool allotment three large mines, the Tilden, the Canton and the Franklin have closed. They have over 800,000 tons of ore hoisted, and will probably hoist very little more this year unless the demand is greater than now expected.

Ore hauling to docks has begun at Escanaba, Marquette, Two Harbors and Duluth, though it may be 10 days before boats can reach those ports. The Minneapolis, Sault Ste. Marie & Atlantic has made contracts under which it will haul about 500,000 tons of ore to Gladstone, on Lake Michigan, against about 100,000 tons in preceding years. The new Marquette range line will begin business in June. The Duluth, Missabe & Northern's No. 2 dock, capacity 35,000 gross tons, will be ready soon after May 1. It will permit the road to load eighteen 400-ft. ships simultaneously, a fact that will give some idea of the enormous possibilities of the road.

No prices have been agreed on for non-Bessemer ores for the year, but they will probably be 60 cents higher than a year ago, when they sold at from $2.10 to $2.25 a ton, and somewhat less than last fall. Half the advance will be absorbed by carrying charges, and part of the remainder by increased wages in mines. Most of the purely non-Bessemer mines will probably shut down, leaving the production to Bessemer mines which produce a low grade incidentally.

Passenger Traffic in England.

The Easter holiday traffic has offered a remarkable proof that England is prospering; it has been heavier than for many years. The resources of all the railroads leading out of London have been nearly exhausted in handling the enormous holiday crowds. Travel to and from the Riviera has been unprecedented; extra trains have been running for several days from Monte Carlo to carry home the returning tourists. Paris has been overrun with English tourists during the week, thousands of them visiting the palace at Versailles in a single day.—*London Correspondent, New York Tribune.*

Lake Notes.

The Northern Steamship Co. has in sight more than enough flour traffic to keep its six 2,500-ton ships busy all the year, and will charter additional vessels. It already has its warehouses crowded with Minneapolis flour.

The American Steel Barge Co. will build a second dry dock at the head of Lake Superior to be about 500 ft. long, 80 ft. wide and 20 ft. deep. It will be the largest on the great lakes. The company will launch three ships in May.

Duluth wheat has been chartered at 3 cents to Buffalo in large quantity. About 9,500,000 bushels have been chartered in all at various rates. Little ore tonnage has been chartered yet, but 3 cents on wheat is equal to $1.12 on ore. Coal contracts have been made to Duluth at 40 cents and to Milwaukee and Chicago at 50 cents.

There are 90,000,000 ft. of lumber on docks at Duluth sold for eastern delivery, and nearly as much more at other Lake Superior ports. Saw mill men at the head of the lakes will curtail their cut for the year about 100,000,000 ft., and those at Minneapolis about 15 million ft. There were cut in the woods tributary to Minneapolis mills during the winter 525 million feet of logs.

CAR BUILDING.

The Lehigh Valley has awarded a contract for 1,000 coal cars to the Michigan Peninsular Car Co.

The 100 hopper bottom cars let by the Pennsylvania Co. to the Wells-French Company, Chicago, are to be equipped with the Schoen pressed steel truck and body bolsters. This makes 2,200 cars that this company has equipped with these bolsters.

The Campbell & House Combination Refrigerating & Freight Car Co., of Baltimore, has secured a contract from the Seaboard Air Line for building cars of its type for that road. The shops of the company are now running with a full complement of hands. The company will also build some cars for the Northern Pacific.

The Columbia & Maryland (electric) Railway has awarded a contract to the Barney & Smith Car Company, of Dayton, O., for eight combination motor cars, six closed and eight open trailer cars, and ten closed motor cars. These cars will have vestibules and lavatories, with center aisles and cross seats. The combination cars will have baggage compartments eight feet long.

BRIDGE BUILDING.

Belair, Md.—The Baltimore & Lehigh will replace the wooden trestle over Deck Creek with an iron bridge.

Boonville, Mo.—The Boonville & Howard County Bridge Co. has been organized to build a highway bridge across the Missouri River. The estimated cost is $200,000.

Bryan, Tex.—A charter has been granted to the company, which proposes to build a bridge across the Brayos River at Pitts' Ferry. W. E. Saunders has been elected President of the company.

Cumming, Ga.—It is stated that bids will be received by H. L. Hawkins, ordinary, till April 29 for building an iron bridge of two 100-ft. spans, and about 380 ft. of framed approaches at Strictland Ferry.

Dixville, Ky.—Bids will be received till May 4 for a steel bridge across Chaplin River by J. L. O'Neal and O. W. Lester, of Harrodsburg, Ky.

Duluth, Minn.—It is reported that the Duluth, Missabe & Northern Railroad Co. has awarded the contract for furnishing the iron work for the 102 ft. span bridge over the St. Louis River to Carnegie, Phipps & Co., of Pittsburgh, Pa., for $16,000.

Gaffney, S. C.—The Georgia Railroad will build an iron bridge at this place, where the intersection of the railroad and street is made.

Galveston, Tex.—The bids for the bridge over Clear Creek between Galveston and Harris counties have been opened. The contract is for a 136-ft. steel span and 220 ft. of trestling. The bids for the total were as follows: George E. King Bridge Co., $3,863; Chicago Bridge & Iron Co., $3,837; Missouri Valley Bridge & Iron Works, $3,949; Penn Bridge Co., $4,218; King Bridge Co., $4,169; New Columbus Bridge Co., $4,269; Youngstown Bridge Co., $3,896; Milwaukee Bridge & Iron Works, $5,233. The Commissioners after considerable discussion agreed to award the contract to the Chicago Bridge Co.

Glendine, Mont.—The King Bridge Co., has finished a long highway drawbridge over the Yellowstone River. The total length of the bridge is 1,750 ft.

Gloversville, N. Y.—The Springfield Construction Co. has been awarded the contract for building a steel bridge over a highway here and work on the structure will begin in about two weeks.

Hartford, Conn.—The bids have been opened for the temporary bridge across the Connecticut River and are as follows: R. F. Hawkins Iron Works, of Springfield, Mass., $23,500. Dean & Westbrook, of New York, plan A, $11,800; plan B, $19,890; plan C, $26.300; plan D, $27,800. John Murks & Son, of New York, $36,895. Densmore & Lay, of Springfield, $22,500. The Berlin Iron Bridge Co., $15 per lineal foot for a piling trestle and $44 per foot for a truss frame superstructure; plan B, $50 per foot; plan C, $38 per ft. George T. Sampson, of Boston, $40,297. The Commission took the bids under consideration, and will decide upon letting the contract later.

Kennebunkport, Me.—It has been voted to raise $11,500 for repairing bridges and for replacing those carried away by the recent freshet.

Hawkinsville, Ga.—Bids will be received till May 6 for building an iron and steel viaduct to the west side approach to the bridge. The length of the approaches is about 400 ft. P. T. McGriff, will give further information.

Morganton, N. C.—The County Commissioners have concluded to build a new iron and steel bridge across the Catawba River, just below the mouth of Upper Creek, and a committee has been appointed to prepare plans and ask for bids. C. Cannon, Morganton, N. C., can furnish additional particulars.

New Haven, Conn.—The plans for the new drawbridge over the Suinnipiac River at Grand avenue have been approved by the government engineer. Bids for the substructure will be received by C. W. Kelly, City Engineer, until April 23.

New York.—A bill has been introduced at Albany authorizing the city to expend $100,000 for a bridge across the Harlem River at Spuyten Duyvil Creek, in a line with Kingsbridge road and the terminus of Broadway.

The bill for a bridge over the Bronx River, at Westchester avenue, has been reported favorably to the House.

Orchard, Col.—The contract for building the bridge over the South Platte has been awarded to F. E. Baker, of Fort Morgan, as the lowest bidder. The bids received were: W. S. Houghton, of Greeley, $3,514; J. Q. Grant, of Denver, $3,117.65; W. E. Towers, of Denver, $3,320; F. E. Baker, of Fort Morgan, $2,725; the Wrought Iron Bridge Co., of Canton, O., $2,895; the Pueblo Bridge Co., of Pueblo, $3,080.

Paterson, N. J.—The County Board of Freeholders have ordered plans drawn for a concrete arch bridge across the Passaic River at West street. The structure will cost $50,000. It will be 295 ft. long, having three spans, the middle span 95 ft. and the others 100 ft. each. It will have a roadway 35 ft. from curb to curb and sidewalks 10 ft. wide.

Pawnee Rock, Kan.—It is said the County Commissioners have decided to build a bridge across the Arkansas River at this place.

Salisbury, N. C.—A company has been formed to build an iron and steel bridge, to cost from $6,000 to $9,000, across the Yadkin River. Plans and specifications of the structure will be prepared and the contract let within a month or so. President Murdoch, of the Salisbury Cotton Mills, and D. R. Julian are understood to be interested in the enterprise.

Syracuse, N. Y.—It is reported that plans for the West Genesee hoist bridge have been submitted to the Council by C. W. Adams, of Albany, State Engineer. If the plans are approved, bids will be asked for at once by R. R. Stuart, the City Engineer.

Topsham, Me.—The contract for an iron bridge over a branch of the Androscoggin River has been let to the George E King Bridge Co.

Union City, Pa.—The Town Council will erect a foot bridge across French Creek, on the site of the old Union & Titusville Railroad bridge, which has recently been removed.

Worcester County, Md.—The Commissioners have been authorized to contract with the Ocean City Bridge Co. for a county bridge.

Yankton, S. D.—Soundings are now being made for the piers of the bridge to be built over the Missouri River, and work will be begun as soon as the danger of high water is over. The contract price of the bridge is $750,000.

Youngstown, O.—Two bridges are to be built over the Mahoning River, and also a railroad bridge over a street.

RAILROAD LAW—NOTES OF DECISIONS.

Carriage of Goods and Injury to Property.

In Texas, in an action for injuries to cattle, caused by a collision between a train on the line over which the cattle were shipped and one on another road, it appeared that in the train which was in the collision there were 13 cars of cattle, four of which were wrecked, and that the other nine cars were placed in another train which originally contained 13 other cars of cattle, and the 22 cars sent on to their place of destination. A witness for plaintiff testified that the 22 cars of cattle were damaged to about one-half of their value. The Supreme Court rules that, as there was evidence of greater damage than could have been effected in the wreck, it was error to refuse to instruct that the company not carrying the cattle was liable only for the damages caused by the wreck, though the court did instruct that each company was only liable for the injuries of which its negligence was the proximate cause.[1]

In Texas it is held that a stipulation in an interstate shipment that the measure of damages for injuries to the property shipped should be governed by the value of the property at its place of shipment, instead of its place of destination, is void, as unreasonable.[2]

In Wisconsin plaintiff, having goods stored in defendant railroad company's warehouse, ordered the same shipped, but was informed by defendant's foreman that the goods could not be shipped until the next day. Plaintiff replied, "All right; I will be there to load them." No receipt for the goods was taken at the time. That night the warehouse and goods were destroyed by fire. The Supreme Court rules, on an issue as to defendant's liability as a carrier, that it was not so clear that the duty of transportation had not arisen previous to the fire, by reason of plaintiff's acquiescence in the delay in shipping, as to justify the direction of a verdict for defendant.[3]

In New York delivery of a portion of the goods on which the carrier has a lien for freight does not discharge the lien on the portion not delivered.[4]

In New York, on an issue as to whether a carrier, by delivery to the consignee, had lost his lien for freight, it appeared that the carloads of coal on which the lien was claimed were, on reaching their destination, placed on spur tracks on the consignee's premises, he furnishing the ties, while the railroad company built the tracks and furnished the iron. The spur tracks were operated exclusively by the railroad company, and part of its charge was for placing the coal on the spur track. Before the consignee could handle the coal, it was necessary to remove the cars from the spur track, and move them along the main track, thence along a branch track on the consignee's premises to his docks, and this was done by an engine and crew of the railroad company, which its superintendent furnished on request. The Supreme Court holds that placing the car on the spur tracks was not a delivery of the coal, so as to deprive the railroad company of its lien for freight.[5]

In Texas it is held that the interstate commerce act providing that the act shall not abridge the remedies "now existing" at common law or by statute, does not confer on the shipper the right to recover overcharges on shipments made prior to the passage of the act, on the ground that it recognizes a common-law or statutory liabilty on the part of the carrier therefor.[6]

In Georgia where a common carrier by mistake contracts with a shipper for transportation at less rates than the schedule rates, on discovering the mistake after the shipment is made, and before the goods have arrived at the point of destination, such carrier may exact the full schedule rate, and hold the goods until it is paid.[7]

Injuries to Passengers, Employees and Strangers.

The Court of Appeals of Texas holds that an employee of a coal company, who, in the discharge of his duty, went upon the cars of the defendant railroad company in order to prevent injury to his employer's property from defendant's negligence, was not a volunteer, and may recover for injuries sustained through defendant's negligence.[8]

The Supreme Court of Missouri rules that one injured on a train who releases the railroad company by an agreement expressly limited to the injuries then perceptible may recover for injuries subsequently appearing.[9]

In Texas the deceased was a section-hand on the defendant's road under the direction of a foreman. In view of an approaching train, of which he was aware, deceased got off the track, but before the train passed the foreman ordered him to remove some dirt from the rails, and, while doing so, he was struck by the engine and killed. The Court of Appeals decides that the deceased was guilty of contributory negligence.[10]

In the same state it is held that the foreman of a bridge gang and a mechanic working under his superintendence are not "fellow servants."[11]

In Virginia it is held that the use of cars of unequal height and mismatched couplings is not such negligence on the part of a railroad company as will render it liable for an injury to a brakeman resulting therefrom.[12]

In the Federal Court where it appeared that one P., who had been run over at a railroad grade crossing, had approached the crossing, with which he was familiar, and the view of which was unobstructed, in broad daylight, at the hour when a well-known train, running at very high speed, was due, without looking, listening, or taking any precautions. It was held that P. was guilty of contributory negligence.[13]

In New York a street railroad company, in order to reach the cable by which its cars were moved, constructed manholes between the tracks, and covered them with iron plates. In the center of each cover was a circular hole, 1⅛ in. in diameter, for the purpose of lifting the cover. The method of construction of defendant's road was approved by the department of public works, and a permit issued for its construction in that way. The court holds that defendant was not chargeable with negligence in respect to such covers because plaintiff's crutch slipped through the whole of one of them, causing plaintiff to fall, where it appeared that a large number of people passed over the manhole in question every day, and that no accident had ever happened before on account of the hole in the cover of that or any other manhole, though there are 1,200 of them on the road.[14]

[1] H. & T. C. v. Williams, 31 S. W. Rep., 556.
[2] Houston & T. C. v. Williams, 31 S. W. Rep. 556.
[3] Schmidt v. C. & N. W., 63 N. W. Rep., 1057.
[4] N. Y. Cent. & H. R. v. Davis, 34 N. Y. S. 206.
[5] N. Y. Cent. & H. R. v. Davis, 34 N. Y. S., 206.
[6] Gatton v. C., R. I. & P., 63 N. W. Rep., 589.
[7] S., F. & W. v. Bundick, 21 S. E. Rep., 995.
[8] W. M. W. & N. W. v. Duncan, 31 S. W. Rep., 562.
[9] Och. v. M., K. & T., 31 S. W. Rep., 962.
[10] Harrison v. T. & P., 31 S. W. Rep., 212.
[11] S. A. & A. P. v. McDonald, 31 S. W. Rep., 72.
[12] N. & W. v. Brown, 22 S. E. Rep., 496.
[13] P. & R. v. Peebles, 67 Feb. Rep., 591.
[14] Wood vs. Third Ave. R. R., 34 N. Y. S., 698.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Cincinnati, Sandusky & Cleveland, semi-annual, 3 per cent. on the preferred stock, payable May 1.
Long Island, quarterly, 1 per cent., payable May 1.
Nashville, Chattanooga & St. Louis, 1 per cent, payable May 1.
Toledo & Ohio Central, quarterly, 1¼ per cent. on the preferred stock, payable April 25.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Alloway & Quinton, special, company's office, corner Delaware and Federal streets, Camden, N. J., May 2; annual, May 5.
Camden & Atlantic, special, company's office, Delaware and Federal streets, Camden, N. J., May 2.
Central of New Jersey, annual, company's office, Jersey City, N. J., May 8.
Chelsea Branch, special, company's office, Delaware and Federal streets, Camden, N. J., May 2.
Columbia & Port Deposit, annual, company's office, Broad street station, Philadelphia, May 4.
Delaware & Hudson Canal, annual, company's office, 21 Cortlandt street, New York, May 12.
Detroit, Lansing & Northern, annual, company's office, Grandledge, Mich., May 13.
Elmira & Lake Ontario, annual, company's office, 20 Whitehall street, New York, May 7.
Freehold & Jamesburg Agricultural, annual, company's office, Delaware & Federal streets, Camden, N. J., May 5.
Grand Rapids, Lansing & Detroit, annual, company's office, Grandledge, Mich., May 13.

Lake Shore & Michigan Southern, annual, company's office, Cleveland, O., May 6.
Lewisburg & Pyrone, company's office, Broad street, station, Philadelphia, May 4.
Michigan Central, annual, company's office, Detroit, Mich., May 7.
Missouri, Kansas & Texas, annual, company's office, Parsons, Kan., May 20.
New York, Chicago & St. Louis, annual, company's office, Cleveland, O., May 6.
Norfolk & Western, annual, company's office, Roanoke, Va., May 6.
Philadelphia & Chester Valley, annual, office of Reading Terminal, Philadelphia, May 4.
Philadelphia, Marlton & Medford, special, company's office, Delaware and Federal streets, Camden, N. J., May 2.
Schuylkill & Lehigh, annual, company's office, Reading Terminal, Philadelphia, May 4.
West Jersey, special, company's office, Delaware and Federal streets, Camden, N. J., May 2.
West Jersey & Atlantic, special, company's office, Delaware & Federal streets, Camden, N. J., May 2.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Master Car Builders' Association* will hold its next convention at Congress Hall, Saratoga Springs, N. Y., beginning June 17. The rates at Congress Hall are $3 a day for single rooms.

The *Master Mechanics' Association* will hold its next annual convention at Congress Hall, Saratoga Springs, beginning June 22.

The *Roadmasters' Association of America* will hold its next annual convention at Niagara Falls, beginning on Sept. 8.

The *Railway Signalling Club* will meet on the second Tuesday of the months of January, March, May, September and November, in Chicago. Mr. George M. Basford, is secretary, The Rookery, Chicago.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month. at 2 p m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month. at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Tuesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March May, September and November. at 2 p. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets on the first Tuesday in each month, at 8 p. m. The headquarters of the society are at 1736–1739 Monadnock Block, Chicago. The business meetings are held on the first Wednesday at its rooms. The meetings for the reading and discussion of papers are held on the third Wednesday at the Armour Institute, Thirty-third street and Armour avenue.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month. at 7.30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at p. m.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.30 p. m. Address P. O. Box 333.

The *Engineers' and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday each month at 8 p. m.

The *Western Foundrymen's Association* meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. S. T. Johnston, Monadnock Block, Chicago, is secretary of the association.

The *Engineers' Club of Columbus, (O.)*, meets at 12½ North High street, on the first and third Saturdays from September to June.

The *Engineers' and Architects' Association of Southern California* meets each third Wednesday of the month in the Hall of the Chamber of Commerce, Los Angeles, Cal.

The *Engineers' Society of Western New York* holds regular meetings the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

The *Civil Engineers' Society of St. Paul* meets on the first Monday of each month, except June, July, August and September.

The *Engineers' Society of Western New York* meets on the first Monday of each month at the Society's rooms in the Buffalo Library.

Civil Engineers' Society of St. Paul.

A regular meeting of the Civil Engineers' Society of St. Paul was held March 6 at 8:30 p. m., 14 members and 2 visitors in attendance. President Stevens in the chair. The constitution and by-laws were amended in several particulars.

Mr. Tracy Lyon talked an hour on "The Maintenance of Railroad Rolling Stock," and after a short discussion the meeting adjourned.

Engineering Society of Western New York.

The society held its regular monthly meeting at the Library Building, Buffalo, President E. B. Guthrie presiding. Mr. C. H. Tutton, a member of the club, read a paper on "The Flow of Water in Pipes," describing a new formula intended to take the place of Krutter's. This was followed by a general discussion.

New England Railroad Club.

The club met at Wesleyan Hall, Boston, on March 10 last. The paper of the evening was by Mr. C. W. Willis on the Jamaica Railroad, dealing more particularly with the Port Antonio extension of that road, which is being built by an American firm of contractors.

This being the annual meeting an election of officers for the coming year was held, resulting in the re-election of the present officers, L. M. Butler, *President;* J. Medway, *Vice-President*, and Charles W. Sherburne, *Treasurer*.

The St. Louis Railway Club.

The officers of the newly organized St. Louis Railway Club met at the Southern Hotel last week and adopted the constitution and by-laws. There are to be three classes of membership: Active, composed of railroad men engaged in active railroad service; associate, such members as have left railroad service or such persons engaged in business connected with the operation of railroads; honorary members. The first regular meeting of the club for discussion will be held on the second Friday in May. There are now 300 members enrolled.

National Convention of Railroad Commissioners.

The call has been issued for the Eighth Annual Convention of Railroad Commissioners to be held at the office of the Interstate Commerce Commission, No. 1317 F street (Sun Building), Washington, D. C., Tuesday, May 19, at 11 a. m.

The Railroad Commissioners of all states, and state officers charged with any duty in the supervision of railroads, are respectfully requested to attend and participate in discussions. The Association of American Railway Accounting Officers is invited to attend, or send delegates, and join in the consideration of questions of interest to their association.

At the last Convention committees were appointed on the following subjects and directed to report to the next Convention: 1. Railway Statistics. 2. Uniform Classification. 3. Legislation. 4. Protection of Public Interests During Railway Labor Contests. 5. Regulation of State and Interstate Electric Railways. 6. Powers, Duties, and Actual Work Accomplished by the Several State Railroad Commissions During the Year. 7. Government Control and Government Regulation of Railways. 8. Safety Appliances. 9. Pooling of Freights and Division of Earnings. The Committee on Organization and Programme for this Convention consists of George M. Woodruff, of Connecticut; Ira B. Mills, of Minnesota; G. G. Jordan, of Georgia; E. C. Beddingfield, of North Carolina, and Edward A. Moseley, Secretary of the Interstate Commerce Commission.

Members of former Conventions are entitled to participate in discussions. All Railroad Commissioners are earnestly requested to attend the coming meeting. The call is signed by Simeon R. Billings, of Michigan, Chairman; John W. Currie, of North Dakota, Vice-Chairman; Edward A. Moseley, Secretary Interstate Commerce Commission, Secretary; Martin S. Decker, Assistant Secretary.

The Engineers' Club of Philadelphia.

In accordance with a motion made at the last meeting, a special committee was appointed, and will report April 18, its opinion of what should be the Club's attitude toward the adoption of the bill presented in the House of Representatives by Mr. Charles W. Stone on the matter of the metric system.

The paper for April 18 is "The Welsbach Light," by Mr. George S. Barrows, illustrated by lantern slides.

At the meeting of April 4 Prof. Edgar Marburg presented the paper of the evening "On Cantilever Bridges." The origin of the word *cantilever* is somewhat obscure. In modern engineering a cantilever, strictly speaking, denotes a girder fixed at one end and otherwise unsupported. For convenience the collective term "cantilever bridge" is applied to a structure of which a cantilever proper forms a component part. The first iron bridges of this type were built in 1876, although their advantages, under certain conditions, had been recognized at an earlier period.

In the paper attention was directed more especially to the comparative merits of cantilever and non-continuous trusses and to the conditions affecting their relative cost. Certain general questions relating to the economic designing of cantilever bridges were also treated in some detail.

The conclusions briefly summarized are as follows:

For moderate span-lengths, cantilever bridges are, under ordinary conditions, uneconomical compared with non-continuous ones, owing to (*a*) increased weight of anchor trusses and (*b*) added cost of shore anchorages in cantilever bridges of the Niagara type.

These advantages are balanced in part by the following favorable features: (*a*) decreased weight of trusses in the cantilever arms and suspended span, as compared with simple trusses equal to their aggregate length; (*b*) decreased cost of erection.

For moderate span-lengths a net comparison will show an economic advantage in favor of simple trusses, unless local conditions are such that the construction of false works would be attended by extraordinary expense.

With increasing span-lengths certain advantageous features of the cantilever system become more emphasized, until a limit is reached, beyond which well-designed bridges of this type are more economical than simple trusses with the same arrangement of piers, aside from advantages incidental to their method of erection.

Theoretic investigations as to the most favorable location of piers for cantilever bridges are of little practical value, *first*, because their position is determined usually by considerations affecting mainly the cost of the substructure and the requirements of navigation, and, *secondly*, because it is not possible to properly include all the essential elements of the problem in a general theoretic treatment. Assumptions must be made which practically vitiate the value of the conclusions.

A theoretic analysis limited to the determination of the least-weight length-ratio of the suspended span to the total span, involves fewer complications, although in this case also the conclusions are influenced to some extent, not definitely determinable, by the relative distances between piers, and by other circumstances. The result reached by the author was that this length-ratio was not less than one-half and usually more nearly two-thirds.

The advantages of the cantilever system for long spans as compared with simple trusses are:

1. Lower economic depth of trusses.
2. More favorable distribution of the dead-load.
3. More favorable distribution of the wind forces.
4. Decreased wind stresses from causes other than their more favorable distribution.
5. Lower requirements for width, center to center of trusses, resulting in (*a*) saving in cost of substructure, and (*b*) saving in weight of floor system and lateral bracing.
6. Saving in cost of erection, usually greater, relatively, than in the case of short spans.
7. The prevention of obstruction to the main channel, during construction, especially important at situations where long spans are required.

For short spans the use of cantilever bridges is not advisable on account of their excessive deflection, aside from their lack of economy. Every precaution should be taken in such cases, especially for highway bridges, to reduce the deflection and vibration to a minimum; (*a*) by using a liberal depth of truss; (*b*) a liberal length-ratio for the suspeded span; (*c*) by avoiding the use of adjustable counters and flexible secondary members; (*d*) by providing a rigid system of diagonal and lateral bracing, particularly the former; (*e*) by riveting the stringers between the floor beams and the latter to the posts, and by employing, if possible, a solid metal floor system, with concrete bedding.

PERSONAL.

—Mr. Charles N. Chevalier has resigned as Superintendent of the Unadilla Valley Railroad, to take effect May 1.

—Mr. George E. McCaughan has been appointed General Claim Agent of the Chicago, Rock Island & Pacific, with office in Chicago.

—Mr. C. J. Chisam has been appointed Assistant General Freight Agent, of the Chicago & Alton, with headquarters in Peoria, Ill.

—Mr. J. M. Smith will return from Utah May 1 and resume his old position of General Passenger Agent on the Altoona, Clearfield & Northern.

—Mr. W. W. Fidler has recently been appointed General Manager of the Middle & East Tennessee Central road, with office at Hartsville, Tenn.

—Mr. John Pullan, agent for the Reading Dispatch, has been appointed Division Freight Agent for the Grand Trunk, with headquarters at Stratford, Ont.

—Mr. D. M. Philbin, formerly General Manager of the Duluth, Missabe & Northern, has been appointed General Superintendent of the Duluth & Winnipeg.

—Mr. Charles H. Burnett has been appointed Purchasing Agent of the St. Lawrence & Adirondack road, with office at No. 51 East 44th street, New York.

—Mr. Edgar A. Ross has been appointed Receiver of the Macon & Northern Road in place of Mr. William H. Ross, who is prevented by sickness from discharging his duties.

—Mr. A. S. Andrews, of Raleigh, N. C., First Vice-President of the Southern Railway, during the absence of President Samuel Spencer in Europe, will act as President of the company.

—Mr. W. B. Lyons, Division Superintendent of the Missouri, Kansas & Texas at Sedalia, Mo., has been granted an extended leave of absence on account of ill health, and sailed for Europe this week.

—Mr. Alfred Noble has taken charge of the foundation work for the new Commercial Cable Building, Broad and New streets, New York City. Messrs. A. McMullen & Co., have the contract for the work.

—Mr. George Masson, Chief Engineer of the Chicago & Grand Trunk and Detroit, Grand Haven & Milwaukee, has been appointed Division Engineer of the Grand Trunk with headquarters at Detroit, Mich.

—Mr. Samuel P. Shane has been appointed Assistant General Freight Traffic Manager of the Erie road, in charge of freight traffic west of Salamanca and Buffalo, with office in the Garfield Building, Cleveland, O.

—Mr. Edward S. Orr has been appointed General Agent of the Baltimore & Ohio and the Baltimore & Ohio Southwestern in St. Louis, representing the executive and traffic departments. This is a new office.

—Mr. C. A. Beach, until recently Division Superintendent of the Lehigh Valley road at Buffalo, on April 15 succeeded General Superintendent M. F. Bonzano of the South Jersey road, Mr. Bonzano, having resigned.

—Mr. John Moss, for 20 years Assistant Local Freight Agent of the Southern Pacific Company, has been appointed Traffic Manager of the new San Francisco & San Joaquin Valley road, now building in California, south of Stockton.

—The Board of Dock Commissioners of New York, has appointed Brig. Gen. William P. Craighill, of the United States Army, Chairman of the Board of Consulting Engineers of the department. The post was made vacant by the death of Gen. Thomas L. Casey.

—Mr. L. L. Lincoln, Superintendent of the Portland & Rumford Falls road in Maine, has resigned that office on account of advanced age and declining health. His resignation, however, has not yet been formally acted upon. Mr. Lincoln has been connected with the road for about 12 years.

—Mr. J. B. Bartholomew, Assistant General Freight Agent of the International & Great Northern has been elected a member of the Board of Administration of the Southwestern Traffic Association, vice E. G. Warfield, and, in consequence of that election, will resign from the International & Great Northern.

—Mr. Horace Baker, Division Superintendent of the Illinois Central, from Cairo to Chicago, has been transferred from Centralia to Chicago and Superintendent McCort, of La Salle, Ill., has been transferred to Centralia, in charge of the Cairo Division, including the Cairo Short Line road, recently acquired by the Illinois Central.

—Mr. Delos Thomas has been appointed Division Freight Agent of the Winston-Salem division of the Norfolk & Western, with headquarters at Winston-Salem, N. C., in place of Mr. J. R. Ruffin, transferred to be Division Freight Agent of the Scioto Valley division, with headquarters at Columbus, O., succeeding J. J. Archer, resigned.

—Mr. George R. Cottingham has been appointed Auditor of the New York, Texas & Mexican and Gulf, West-

ern Texas & Pacific roads, forming the Victoria division of the Southern Pacific, in Texas. He succeeds Mr. J. L. Boyle, who resigns to go to Los Angeles. Mr. Cottingham is now chief clerk in the auditor's office of the Southern Pacific at Houston.

—Mr. Joseph Crawford, formerly Superintendent of the New York Division of the Pennsylvania, has been appointed General Agent for the company at Washington. Mr. Crawford was compelled about a year ago to resign on account of ill health, resulting from a severe accident received during the erection of the iron work of the Jersey City Station. His complete recovery having been effected, he re-enters the service.

—Mr. G. F. Jarvis's appointment as the sole receiver of the Louisville, Evansville & St. Louis road, to succeed Receivers Hopkins and Wilson, is to take effect May 1. Mr. Jarvis was recently Assistant General Superintendent of the Lake Erie & Western, and was last week appointed Receiver of that portion of the Louisville, Evansville & St. Louis, east of Mount Vernon, Ill. His jurisdiction is now extended over the entire road.

—Mr. Crawford Marley has recently died in New Zealand at the age of 83; and, according to English papers, he was the last survivor of those who rode on Stephenson's engine, No. 1, on the Stockton & Darlington Railway. Marley was one of a party of boys who helped fill the boiler of the engine, by means of buckets, for its first trial trip on that road, and he and the other boys, in return for their assistance, were invited to take a ride.

—Mr. Julian R. Lane, formerly Superintendent of the Macon & Birmingham road under the Receiver, has been appointed General Manager. Mr. Lane is a recent graduate of the University of Georgia in its civil engineering course. After leaving college he went into the shops of the Georgia Southern & Florida as an apprentice and later was a fireman and then locomotive runner. Last year he became Superintendent of the Macon & Birmingham.

—Ex-Governor Thomas M. Holt, of North Carolina, who died at his home at Haw River, N. C., April 11, was for many years one of the leading railroad officials of that state and a large holder of railroad securities. Among the positions held by him was that of President of the North Carolina Railroad, now one of the divisions of the Southern Railway. This position he held for twelve years. He had been Speaker of the House of Representatives, President of the Senate and Governor of his state.

—Mr. James Oborne, who has been Superintendent of the car and fuel service of the Canadian Pacific, has been transferred to the office of Vice-President Shaughnessy as his assistant. He has been with the Canadian Pacific since 1883, entering its employ after nine years' service with the Grand Trunk. Mr. George S. Cantlie, for some years past at the Dalhause Square station at Montreal, has been appointed Superintendent of Car Service, taking charge of the office vacated by Mr. Oborne.

—Mr. H. W. Gays, who is now General Manager of the St Louis, Chicago & St. Paul Railroad, has been its Traffic Manager since August, 1894. Before that time Mr. Gays had been General Manager of the St. Louis Merchants' Terminal Railroad Bridge, resigning on the consolidation of the company with the Terminal Railroad Association. Previously he had been General Manager of the Wiggins Ferry Company, at St. Louis, for nearly 10 years. He has also been Assistant General Freight Agent of the Cincinnati, Indianapolis, St. Louis & Chicago road.

—Mr. J. Waldo, now in charge of the operation of the Galveston, La Porte & Houston road in Texas, for the Receivers, has been elected a member of the Board of Administration of the Southwestern Traffic Association. He will shortly take up his new work, removing to St. Louis. Mr. Waldo is a very well known traffic officer in the West, and he was for some years Commissioner of the Texas Traffic Association. He resigned the commissionership in 1889, and became Traffic Manager of the Missouri, Kansas & Texas, and later was promoted to be Vice President of that company.

—Certain changes of officers of the St. Louis, Alton & Terre Haute have followed the merger of that company with the Illinois Central. Mr. George E. Lary, formerly General Freight and Passenger Agent of the road, has been appointed Assistant General Freight Agent of the Illinois Central, with headquarters at St. Louis. E. F. Hilgard, formerly Assistant General Freight Agent, retains his position, with a change in title. Mr. C. C. McCarty has been appointed Division Passenger Agent, with headquarters in St. Louis. The accounting and auditing departments will be removed from St. Louis to Chicago.

—Mr. F. B. McKercher has been appointed Assistant General Manager of the Mexican Central, having charge of the car service. Mr McKercher was formerly in the service of the Atchison, Topeka & Santa Fe, as were his superiors on the Mexican Central, President Robinson and General Manager Nickerson. Soon after the appointment of the latter as General Manager of the Mexican Central, Mr. McKercher resigned as Chief Clerk in the office of the General Superintendent of the Atchison, Topeka & Santa Fe and followed Mr. Nickerson, who had been General Superintendent, to the City of Mexico, where he became Superintendent of Car Service on the Mexican Central.

—Mr. Wm. H. Booth, M. Am. Soc. C. E., formerly of New York, has resigned his appointment as Managing Engineer to the LeGrand & Sutcliff Artesian Well Co., and has taken offices at Piccadilly Mansions, No. 17 Shaftesbury avenue, London W., where he will practice in steam engineering, water supply and electrical transmission of power, paying special attention to artesian wells, questions of hydra-geology, electric transmission and the introduction of good American patents to manufacturers and financiers in Great Britain. He would be glad of all American catalogues and is desirous of taking up the representation of good American houses, his office being central.

ELECTIONS AND APPOINTMENTS.

Butler & Pittston.—The officers of this new company are: President, John Dick, Meadville; Secretary, N. C. McLaughlin, Meadville; Treasurer, A. B. Westervelt, New York. The Directors are John Dick, W. S. Rose, J. G. Foster, W. K. Richards, N. C. McLaughlin and W. G. Sargent, Meadville; J. T. Blair, Greenville, Pa.

Canadian Pacific.—James Oborne has been appointed assistant to the Vice-President. Since June, 1893, he has been superintendent of the car and fuel service. George S. Cantlie has been appointed Superintendent of Car Service, taking charge of the office vacated by Mr. Oborne. W. A. Grant has been made Stationery Agent. A. D. Mactier has been appointed General Baggage Agent.

Chesapeake, Ohio & Southwestern.—The annual meeting of the stockholders of the company was held in Memphis last week, and the following were elected directors: John Echols, W. R. Ray, R. J. Tilford, J. A. Leach, E. S. Monohan, John J. McHenry, George C. Thompson, J. J. B. Hilliard and M. Gilleas. The only change made from the directory of last year was the election of George C. Thompson, of Paducah, Ky., substituted for Col. Attilla Cox, of Louisville, Ky., Colonel Cox having declined re-election.

Chicago, Paducah & Memphis.—E. C. Porterfield has been appointed Auditor, with office at St. Elmo, Ill., vice T. K. Jenkins, resigned.

Cleveland, Cincinnati, Chicago & St. Louis.—W. J Hartman has been appointed Inspector and Instructor of Train, Air and Steam Appliances, with headquarters at Indianapolis, Ind. All orders and instructions issued by him to master mechanics, enginemen and trainmen in regard to the proper method of application and handling these devices must be duly respected.

Dayton, Lebanon & Cincinnati.—M. H. Cook is now Superintendent and General Freight and Passenger Agent, vice W. B. Hallsted.

Deer Park & Pittsburgh Connecting.—The directors of this new Maryland company are: George W. Haulenbeek, Ferdinand C. Latrobe, of Baltimore; G. S. Hamill and D. E. Offutt, of Oakland; L. T. Yoder and Samuel W. Vandersaal, of Pittsburgh, and I. D. McKee, of Philadelphia.

Delaware & Hudson Canal.—Abel I. Culver is now Assistant Comptroller, with office at New York. Paul Wadsworth has been appointed General Freight Agent, with office at Albany, N. Y., vice James Colhoun, resigned; and the office of Assistant General Freight Agent, previously held by him, has been abolished. The title of L. H. Stewart has been changed from Chief Clerk to Local Auditor.

Drummond County.—C. Church has severed his connection with this road, and William Farwell, Vice-President, is now in charge of operation. His office is at Sherbrooke, Que.

Forth Worth & Rio Grande.—The directors of the company last week elected officers for the ensuing year as follows: Chairman of the Board, H. B. Hollins, of New York; President, John Hornby; Vice-President, C. M. Wicker, of New York; Treasurer, J. Van Ransselaer; Auditor and Secretary, A. K. Dixon; Assistant Secretary, C. L. Horton.

Galveston, Houston & Henderson.—The annual meeting of the stockholders was held at Galveston, Tex., April 7, and the following directors were elected: F. P. Olcott, George J. Gould, H. C. Rouse, New York; Major R. B. Baer, Houston; J. M. Duncan, Tyler; T. M. Campbell Palestine, and James A. Baker, Jr., Houston. Three of the directors represent the International & Great Northern and three represent the Missouri, Kansas & Texas. The seventh director, Mr. Olcott, is President of the Central Trust Co. of New York.

Grand Trunk.—J. E. Quick, General Baggage Agent of the lines west of the St. Clair River, has been appointed General Baggage Agent of the entire Grand Trunk, with headquarters at Toronto, the appointment to take effect from April 15. This is in succession to Mr. Samuel Symons, the present General Baggage Agent.

Houston & Texas Central.—The annual meeting was held at Houston, Tex., last week, and the following directors were re-elected: Thomas H. Hubbard, Jr., J. E. Gates, New York; J. Kruttschnitt, San Francisco; G. A. Quinlan, T. W. House, A. P. Root, C. W. Bein, J. M. Lee, E. W. Cave, Houston. The directors elected the present officers as follows: President, Thos. H. Hubbard, New York; Vice-President, G. A. Quinlan; Secretary-Treasurer, E. W. Cave, Houston; Assistant Secretary-Treasurer, I. E. Gates, New York.

Illinois Central.—The acquisition of the St. Louis, Alton & Terre Haute, has resulted in the following changes in divisions: The district, Centralia to Cairo inclusive, and all of the divisions of the St. Louis, Alton & Terre Haute road, will be known as the St. Louis Division. H. McCourt is appointed Superintendent of the St. Louis Division, with offices at Centralia, Ill. The Chicago Division, terminating at Centralia, will be extended northward to include the Chicago terminals. The office of Mr. H. Baker, Superintendent of the Chicago Division, will be at Central Station, Chicago. Mr. A. H. Egan is appointed Assistant Superintendent of the Chicago Division, with office at Fordham Yard, Chicago, and will have special charge of the transportation service of the Chicago Terminal District. Mr. J. W. Higgins is appointed Superintendent of the Amboy Division, with office at La Salle, Ill.

Mr. W. S. Wilson, heretofore Superintendent of the Cairo Short Line, with office at Pinckneyville, is appointed Assistant Superintendent of the St. Louis Division, with headquarters at Pinckneyville.

International & Great Northern.—The stockholders of the company met at Palestine, Tex., last week, and elected the following Directors: George J. Gould, Edwin Gould, Howard Gould, S. H. Clark, H. B Kane, A. R. Howard, F. A. Rice, Ira H. Evans, and R. B. Hawley. The Directors held their annual election of officers on April 8, with the following result: President, George J. Gould; Vice-Presidents, S. H. H. Clark and H. B. Kane; Secretary and Treasurer, A. R. Howard; Assistant Secretary and Treasurer, H. K. Heinson.

Mexican Central.—F. B. McKercher has been appointed Assistant General Manager of this company, with headquarters at the City of Mexico. In addition to other duties Mr. McKercher will, until further notice, continue to perform those of Car Service Superintendent.

Mexican International.—At the annual meeting of the stockholders of the railroad in New Haven, Conn., on April 12, the present Board of Directors was re-elected, as follows: C. P. Huntington, Charles F. Crocker, J. S. Mackie, F. H. Davis, George Howes and Charles Babbidge, of New York, and H. Lynde Harrison, of New Haven.

New Jersey & New York.—The Erie Railroad ha taken possession of this road, under the terms already published. The following circular announcing the new appointments on the road was issued last week by President H. W. De Forest, of the last-named road: General Superintendent, C. R. Fitch; General Freight Traffic Manager, Frank Harriott; General Passenger Agent, D I. Roberts; Auditor, J. T. Wann; Treasurer, E. White. These are the general officers of the Erie.

Ohio Southern.—N. E. Matthews has been appointed Purchasing Agent, with office at Springfield, O., vice C. H. Roser.

Pittsburgh, Cincinnati, Chicago & St. Louis.—Three directors of the company were elected at the annual meeting at Pittsburgh, April 14, as follows: Briggs Cunningham, Cincinnati; George Willard, Chicago, and Joseph Wood, of Pittsburgh. They will serve until April, 1,900.

St. Louis, Alton & Terre Haute.—The Illinois Central, having assumed control of this road, the jurisdiction of the following officers of the road has been extended over the St. Louis, Alton & Terre Haute. A. W. Sullivan, General Superintendent; J. F. Wallace, Chief Engineer; Wm. Renshaw, Superintendent of Machinery; J. M. Daly, Superintendent of Transportation; G. M Dugan, Superintendent of Telegraph; J. G. Hartigan, Assistant General Superintendent; T. J. Hudson, Traffic Manager; M. C. Markham, Assistant Traffic Manager; A. H. Hanson, General Passenger Agent.

C. F. Parker has been appointed General Agent at St. Louis. He will have charge of matters pertaining to the traffic and transportation departments at this point, and will also have charge of the terminals at East St. Louis.

Southern.—Robert Potts, of Richmond, Va., a brother of John D. Potts, Assistant General Passenger Agent of the Chesapeake & Ohio, has been appointed Freight and Passenger Agent at Raleigh, N. C., vice A. S. Lewter, resigned.

Southern Pacific.—The annual meeting of the company was held on April 8, and directors were re-elected as follows: C. P. Huntington, Thomas E. Tillman, E. Huntington, Charles F. Crocker, Russell P. Wilson, George Crocker, Thomas H. Hubbard, Charles G. Lathrop, J. C Stubbs and N. T. Smith. C. P. Huntington was re-elected President. The list of officers is the same as that of last year, with two exceptions. Mr. Hubbard, of New York, was chosen Second Vice-President to succeed the late A. N. Towne, and E. C. Wright, who has been the General Auditor, was chosen as Secretary to succeed the late G. L. Lansing.

Stuttgart & Arkansas River.—H. E. Martin has been appointed Manager for the Receiver of this road and the Pine Bluff & Eastern, vice C. H. Haughton, resigned.

Texas & Pacific.—At the annual election at Dallas, on April 11, the following directors were elected: Samuel Sloan, R. M. Galloway, John T. Terry, Samuel Thomas, Russell Sage, George J. Gould, Thomas T. Eckert, John J. Moore, C. M. McGhee, John P. Muln, A. L. Topkins, Howard Gould and C. E. Satterlee, of New York; Isaac J. Wistar and J. N. Hutchinson, of Philadelphia; Simon H. Smith, of Louisville, and S. H. H. Clark, of St. Louis. The following were elected officers: George J. Gould, President; S. H H. Clark, Vice-President; C. E. Satterlee, Secretary and Treasurer; L. S. Thorne, Third Vice-President and General Manager.

Union Pacific.—Alexander McGregor has been appointed Roadmaster at Denver, vice John Swanson, transferred to another position. Mr. McGregor was connected with the Denver & Rio Grande road until last fall, when he resigned to engage in mining.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Aberdeen & West End.—President A. Frank Page, who is also sole owner of the road, has given out the contract for the extension to Asheboro, N. C., where connection will be made with the Southern road, which is also to build a link to complete the connections of the two roads, as noted in these columns last week. The Aberdeen & West End, having just completed an extension to Troy last month, the new extension now to be made will be all that is necessary to open up an important lumber section to the Southern Railway. At present the Seaboard Air Line has a monopoly of this business. The new connection will be 25 miles long.

Ashcroft & Cariboo.—The company's act of incorporation in British Columbia has been amended so as to give the company the right to build a narrow gage road instead of a standard gage. Failure to construct the whole of the road within the time specified will not necessarily mean the forfeiture of whatever sections are constructed.

Boston Elevated.—The organization of this company was completed at Boston last week, the directors including many very well-known men of financial strength. The company has been organized under an old charter and the directors last week failed to secure the introduction in the State Legislature of several amendments to the existing charter. A good deal of mystery is maintained as to the company's plans, and as to its relations with other companies, the old Meigs elevated project, and others. It is proposed, however, to build an elevated line connecting the Northern and Union stations in Boston, and then to connect the suburbs of Boston with the city. The directors are William A. Gaston, President; F. J. Peabody, of Kidder, Peabody & Co., Jacob C. Rogers, William Endicott, Jr., Samuel Carr, of the F. L. Ames, estate; Frederick Ayer, of Lowell; Charles J. Paine, James M. Prendergast, Eben D. Jordan and T. Jefferson Collidge, Jr.

Bridgeton & Saco.—It is said that the control of this road has been recently transferred, and that the new owners will relay the rails, purchase new cars and make other improvements. It is a 16-mile line in Maine.

Butler & Pittston.—A charter was granted at Harrisburg on April 8 to this company, with an authorized capital of $5,000,000. The new line is to connect the Pittston, Shenango & Lake Erie road at Butler, with the Union Railroad, owned by the Carnegie Steel Co., which will thus find a more direct route for ore and coal shipments. The construction of the new road will give the Pittsburgh, Shenango & Lake Erie an entrance to Pittsburgh. The directors are said to have made a contract with the Carnegie interests for handling the freight of that company between Pittsburgh and Lake Erie. John Dick, of Meadville, Pa., is President of the new company.

Two surveying parties are now in the field to survey the new road. One party, working from the Pittsburgh end is under G. W. Sykes, Chief Engineer, Greenville, with William McFetridge, Greenville; Fred James, Grove City, and T. W. Brigden, Assistant Engineers. One party will start out from Pittsburgh, while the other will work south from Butler. The line will cross the West Pennsylvania and the Pittsburgh & Western several times, while to get under the main line of the Pennsylvania will require quite a tunnel.

Dallas & Southeastern.—The charter of this railroad was filed with the Attorney-General at Austin, Tex., for approval last week. The object of the new corporation is to purchase and extend the Texas Trunk road, from Dallas to Cedars, in Kaufman County, which was recently purchased at a receiver's sale by E. R. Pardee, of New York. Mr. Pardee is the principal stockholder in

the new company, the others being Dallas and McKinney residents.

Dauphin Colonization.—Contracts for the construction of the Dauphin colonization road, in northwestern Manitoba, have been let to McKenzie & Mann, well-known Canadian contractors. The line will connect Winnepeg with Lake Winnepisogis, opening a magnificent grain country. The province has guaranteed its bonds to the amount of $8,000 a mile. About 150 miles will, it is expected, be graded this year.

Denison & Northern.—Grading on the northern extension into the Indian Territory, the construction of which by the Receiver, was recently authorized by the United States Court, was commenced last week at Daugherty, I. T., the present northern terminus of the road. The extension will go through coal and iron lands and reach valuable asphaltum mines. It will be about 104 miles long, and the court has directed that the contract shall not be awarded at a higher figure than $11,000 a mile of road. A contract has been approved with the Mineral Belt Construction Co., of which O. H. Brown, President of the railroad, is Secretary. The contract with this company, however, has been objected to by the Vice-President of the railroad, who is a large stockholder. The court has not yet given any opinion on this petition, but has referred certain matters in it to a special master for report.

Flint & Pere Marquette.- General Manager Crapo, in an interview at Detroit, Mich., this week said that the new line of this company between Monroe, Mich., and Toledo, will be completed and in operation by next September, when the Flint & Pere Marquette will resume its through traffic with Ohio and Eastern points. An arrangement has been consummated whereby the Wabash and the Flint & Pere Marquette will make a short route between Toledo and Detroit.

Florence & Cripple Creek.—The company is reported to be contemplating building a branch line from Victor, a distance of 10 miles, to a new townsite called Wilmington, Cal., near Nipple Mountain.

Florida East Coast.—The southern extension of this road building south of Palm Beach, Fla., has been opened for regular operation to Miami. The distance from Jacksonville is 366 miles. This distance is covered in a little over 12 hours. The morning train will leave Jacksonville at 8:45, reach St. Augustine at 10, and will then continue the trip down the coast, reaching Miami at 10:45 p m. The new extension from Palm Beach to Miami is 67 miles. The road traverses the east coast in an almost unbroken line, and its terminus is at the southernmost point reached by any railroad in the United States, as is pointed out by the Jacksonville *Citizen*.

Frederick & Middletown.—At a special meeting of the Board of Directors of the railroad last week it was decided to use electricity as motive power for the road instead of steam. The company was organized to build a road in the eastern peninsular of Maryland.

Gulf, Colorado & Santa Fe.—Mr. G. W. Finlay, President of the Texas Sandstone Company, owning large quarries on the Colorado River, in Western Texas, is making an effort to induce the officers of this company to build a branch from Antelope Gap to the quarries.

Lima Northern.—Two work trains have been put on ballast work between Lima and Napoleon, giving employment to 200 men. The track will be completed to Wauseon within thirty days.

Mineral Belt.—This company was incorporated in Missouri last week. The company is organized to build a road 25 miles in length from Webb City, Jasper County, through the town of Carterville, in the same county, to Granby, Newton County, with a branch connecting the line with the city of Joplin, Mo. The company is incorporated by J. H. Emmert, W. E. Dunn, S. T. Fulton, J. S. Ford and I. P. Dana, all of Kansas City.

Moore County.—A movement has been started among the business men of Concord, N. C., to secure the extension of this road to that city, extending through the five counties of Moore, Richmond, Montgomery, Stanly and Cabarrus. The proposed route is from Aberdeen, the present terminus of the road, via Norwood and Mt. Pleasant to Concord. The proposed extension of the Seaboard Air Line from Charlotte to Concord would give a valuable connection. The Moore County extension will also open another through connection for the Seaboard Air Line between Monroe and Charlotte to Raleigh, reducing the distance. At present the Moore County road has only 12¼ miles in operation, from Aberdeen to Craigrownie. Last year a dividend of 10 per cent. was declared on the capital outstanding, $38,950

New Roads.—The committee appointed at Cumberland, Wis., to consider the project of a connection with the Minneapolis, St. Paul & Sault Ste. Marie, have decided to recommend the incorporation of an independent company to build a road from Cedar Falls to Superior, Wis., 120 miles. This would form a connection with the Milwaukee at Cedar Falls, with the Wisconsin Central at Warner, with the "Soo" and with the Omaha at Cumberland. It is proposed to complete the proposed road from Cumberland, to the connection with the Minneapolis, St. Paul & Sault Ste. Marie, eight miles.

Pittsburgh & Clearfield Mineral Mfg. Co.—This company, with headquarters in Pittsburgh, has given Winter & Miller the contract to build a road five miles long along Montgomery Creek in Montgomery Valley to Clearfield, Pa., where connection will be made with the Beech Creek, Pennsylvania and Buffalo, Rochester & Pittsburgh. The company, capitalized at $200,000, will start an industrial town, including a glass plant, on its extensive property along the proposed line. The officers of the company are Emmanuel Barrick, President; Alexander M. Johnston, Vice-President; George Shoenberger, Secretary.

Terminal Railway of Buffalo.—By a decision of the Appellate Division of the New York Supreme Court the action of the State Railroad Commission in granting permission to the Terminal Railroad Company of Buffalo to build a railroad under Section 59 of the state railroad law, from Buffalo to Depew, has been affirmed. The facts in the case have been frequently told in this column. Two companies were organized at about the same time to build a road from Depew, a station just east of Buffalo, to a station southwest of the city, on the Lake Shore & Michigan Southern. The Railroad Commissioners granted the application of the Terminal Company and denied that of the second company, the Depew & Southwestern, which then appealed to the courts to compel the Commissioners to give the company a certificate authorizing it to construct its road.

Upper Hudson.—This company was incorporated in New York last week to build a road 20 miles long between Corinth and South Glens Falls, Saratoga County. The Directors are Warner Miller, Louis Windmuller, Kennedy B. Fullerton and John B. Gleason, of New York City, and H. G. Burleigh, of Whitehall, N. Y.

Electric Railroad Construction.

Baltimore, Md.—The Maryland Traction Co., it is stated, will build an electric road about six miles long through Woodberry and other suburbs to Mt. Washington. George R. Webb, of the Pikesville & Emory Grove Co., is reported as interested.

Cornwall, Que.—Messrs. Hooper & Starr have begun work on the electric railroad here, which will carry both freight and passengers. The road will be equipped by the Canadian General Electric Co.

Detroit, Mich.—The Detroit Railway Co. expects to begin work on its road to Ann Arbor about May 1, and most of the right of way for the distance of 40 miles has been secured.

Elyria, O.—The Lorain County Electric Railway Co. has filed articles of incorporation. The company is capitalized at $300,000, and is composed of W. E. Miller, E. K. Mussey, W. G. Sharp and others. It is proposed to build the road from Elyria to Oberlin.

Geensville, S. C.—It is proposed to extend the electric railroad, recently decided to be built in the town, to Pelzer, Piedmont and Paris Mountain. This would give the road about 25 miles of track.

Hoboken, N. J.—The common council has passed an ordinance giving the Jersey City, Hoboken & Rutherford Railroad Co. permission to build an electric road in Hoboken. Application for the franchise was made over a year ago, but many property owners were opposed to it, and the council delayed final action. The company is to pay $20,000 to the city for the franchise.

Lewistown, N. Y.—The route of the Lewistown & Youngstown Frontier Railway has been determined, and plans and specifications for building the same are being made by Engineer Voorhees.

New Orleans, La.—R. R. Zell, A. E. Sprengall, Alfred Bonnabel and others have asked for a franchise for an electric railroad, to be about six miles long, in Jefferson Parish.

Oshkosh, Wis.—A franchise has been granted to the Oshkosh, Berlin & Omro Railroad Co. to build an electric road between this city and Berlin by way of Omro, a distance of 40 miles. Under the terms of the franchise the work must be done in four months, and the road must be in operation by Jan. 1 next. This company was incorporated about a month ago.

Philadelphia.—The Supreme Court has decided that the Fairmount Transportation Co. may build its proposed electric railroad in Fairmount Park. The Park Commissioners had granted the company the right to build the road, but the city brought an injunction against the company to prevent the road from being built. The company proposes to build about seven miles of track around the West Side park and a branch crossing the Schuylkill to the East Side park. The capital stock of the company is $2,000,000 and George S. Gandy is President.

Pottsville, Pa.—The Schuylkill Electric Railway Co. will advertise for bids to finish the extension of the road from Mauch Chunk street to Schuylkill Haven. It is stated that with 75 to 100 men the work can be finished in a month. The rails and ties have been delivered.

Sioux City, Ia.—The South Sioux City Traction Co. is constructing its line from the Pacific Short Line bridge to the station of the Chicago, St. Paul, Minneapolis & Omaha.

Syracuse, N. Y.—John S. Kaufman, A. C. Chase, E. A. Powell and others have applied for a franchise for an electric railroad to Lake Onondaga.

Utica, N. Y.—The Utica Suburban Railroad Co. has been incorporated with a capital of $50,000 by Camille Wendenfels, James T. Gardiner, W. B. Putney and others.

Washington, D. C.—A bill has been signed at Annapolis making the charter of the Baltimore & Washington Transit Co. perpetual and authorizing it to use electricity.

Williamsport, Md.—The Mayor and Council have unanimously decided to grant the Hagarstown Street Railway Co. the right of way on any streets in Williamsport the company wishes. The track laying has been begun at Frederick.

Winchester, Mass.—A franchise has been granted to the Winchester, Arlington & Watertown Street Railroad by the Selectmen of Winchester.

GENERAL RAILROAD NEWS.

Atlantic & Pacific.—The final decree in the foreclosure case of the United States Trust Co., of New York, against the railroad company, was signed by Judge Collier at Albuquerque, N. M. It provides in substance that if the Atlantic & Pacific fails to pay within 90 days the amount found to be due for principal and interest upon the bonds, the property shall be sold at Gallup, N. M. The master is directed to accept no amount less than $5,000,000. O. N. Marron was appointed master to make the sale. The decree is the preliminary step toward the foreclosure sale of the property. It covers the line in New Mexico, but no decree in Arizona has yet been given. Similiar proceedings will be taken in other sections of the company's territory. It seems to be still doubtful whether the Atchison's Reorganization Committee will bid the sum named by the court as the minimum price.

The three arbitrators, Milton H. Smith, President of the Louisville & Nashville; Edward S. Washburn, Vice-President of the Kansas City, Fort Scott & Memphis, and W. W. Finley, Third Vice-President of the Southern, appointed some time ago to report upon the proportion of earnings payable to the Atchison and to the Atlantic & Pacific respectively, where both roads operated over the Atlantic & Pacific, made their report this week. The separation of the interests of the two properties at the time of the Atchison reorganization necessitated an adjustment of their traffic balances from the date of the Atlantic & Pacific receivership. The award of the arbitrators involves a payment by the Atchison company of about $1,000,000. The percentage of through rates due the Atlantic & Pacific is increased by the arbitrators about five per cent., and its share of the annual rental to be paid the Mojave division is decreased about $300,000. Officers of the Atlantic & Pacific estimate that the increase in traffic earnings of that road in consequence of this decision will amount to about $250,000 per annum. Officers of the Atchison estimate a much smaller increase to the Atlantic & Pacific, placing the figures from $60,000 to $80,000.

Baltimore & Ohio.—General Louis Fitzgerald, the Chairman of the Reorganization Committee, states that the Receivers will provide for the new locomotives and rolling stock by means of a car trust, which would be taken into account in the reorganization plan.

Cape Fear & Yadkin Valley.—Following are the questions framed by Judge Simonton of the United States Court at Charleston, S. C, and referred to the Special Master appointed by him, Mr. E. S. Martin, of Wilmington, N. C.:

"1. What has been the relative earning capacity of these separate divisions for a period of five years? That is to say: What is the value of the aggregate of volume of freight going over each division between its termini, and the value of its passenger traffic; and what are the necessary operating expenses?

"2. What is the cost of repair of its roadbed and track?

"3. What is the comparative estimate of the value of the respective divisions by disinterested persons who have had experience in railroads, furnishing such estimate under oath, under cross-examination, and giving the grounds for the estimate?"

Central Vermont.—A dispatch from Boston says that it is authoritatively stated that the floating indebtedness of the company will exceed $3,000,000. Of this amount promissory notes exceed $2,000,000. The Grand Trunk claims $1,400,000, made up in part as follows: $425,000 traffic balances, which claim is in dispute; $114,755 promissory notes, not included in the above $2,000,000; $500,000 five per cent. consolidated bonds which the Central Vermont borrowed of the Grand Trunk, agreeing to return same July 1, 1896. For these bonds the Central Vermont gave the Grand Trunk $1,000,000 four per cent. bonds as collateral, and the claim is made that the Central Vermont also owes the Grand Trunk $400,000 four per cent. bonds, which have never been delivered. In addition to the above the company gave a chattel mortgage in January, 1893, to William S. Webb as trustee to secure $500,000 of bonds of said company on 10 years' time at six per cent. interest, payable semi-annually. This was for rolling stock.

Cleveland, Lorain & Wheeling.—At the special meeting of stockholders in Cleveland April 9, it was voted to authorize the directors to issue a mortgage for $1,000,000. The proceeds of the sale of the bonds will be used for improvements, among which will be the shortening of the main line and reduction of grades for through lake business, the building of a branch into the Berea stone quarries, various extensions of sidings and coal branches, purchase of additional equipment, improvement of car and machine shops and further improvement of the docks at Lorain.

Colorado Midland.—William Lidderdale, Chairman of the London Bondholders' Committee, has issued a statement in regard to the property. Among other things he says: "The London Committee are strongly impressed with the belief, in which their New York colleagues and the Receiver entirely concur, that no scheme of reorganization at once just to the bondholders and fairly certain in its results can be presented until the railway shall have been administered by its own Receiver for at any rate one full year. When the statements for that period are before the Committee they will at once address themselves to a consideration of such a scheme. The reorganization will probably embrace the retirement of the Busk Tunnel and Aspen Short Line bonds, which carry heavy rates of interest, as well as due provision for improvements of the road bed, for rebuilding some of the bridges, and for an increase of rolling stock."

Duluth & Winnipeg.—The foreclosure sale of this line, set for April 9, has been postponed till May, through the intervention of interests unfriendly to the Canadian Pacific. When the road is finally secured by the Canadian Pacific, as no one doubts it will ultimately, it will be so extended as to form an important link in the main line of the road.

Excelsior Springs.—Attorney Charles A. Braley and Henry Garland, Western Passenger Agent of the Wabash Railroad, have been made Receivers of this road, which extends from Excelsior Springs, Mo., to Excelsior Springs Junction, 14 miles, where it connects with the Wabash. It was built about two years ago by a local company, to give the town of Excelsior Springs a connection with the Wabash at the Missouri River, near Kansas City.

Grand Trunk.—At the semi-annual meeting of the stockholders was held at London. Sir Charles R. Wilson, as President of the company, made the customary address, commenting on the results of operations for the last year and the policy of the directors. President Wilson said that the Board had nothing to complain of in regard to the volume of traffic, but, unfortunately, the freight rates were lower than they ever had been before. Reduction of rates had caused a loss of revenue amounting to £80,000 during the last year. He expressed regret that the Canadian Pacific had not joined the Joint Traffic Association. Among the important steps the Board had taken, he said, was to obtain the appointment of the General Manager of the Grand Trunk as one of the receivers of the Central Vermont. The Board had found upon taking office that the Grand Trunk held $751,000 worth of the first mortgage bonds of the Central Vermont, and the affairs of that railroad were going from bad to worse. Since the report was issued an arrangement had been concluded with the Canadian Pacific which would prevent the building of a line between Hamilton and Toronto. Another transaction which had been entered into was the leasing of a short line to the St. Lawrence & Adirondack on terms favorable to the Grand Trunk. Eleven months had elapsed since the Board went into office, and the shareholders had a reasonable right to expect a more definite opinion of the prospects of the company than had been given to them in October. But the Board had a difficult problem dealing with roads with excessive capital and burdened by affiliated lines, acquired at excessive cost. Progress must be gradual, and the efforts of the Board to effect reforms must have time to develop. Despite an unusually severe winter, causing, for days together, a cessation of traffic, the earnings of the Grand Trunk had shown in the aggregate a steady increase over the returns of 1895. Another satisfactory feature was the improvement shown in the Chicago & Grand Trunk. The attendance of directors and shareholders was large, and the vote on the adoption of the report unanimous.

Green Bay, Winona & St. Paul.—Judge Seaman has issued an order for the sale of the road, May 12, at Green Bay, Wis. The master is directed to reserve $105,000, with interest, from the proceeds, in order to protect the minority bondholders, who secured a postponement of the sale, if the Court of Appeals decides in their favor.

Hendersonville & Brevard.—The financial troubles of this company, alluded to in these columns last week, are being satisfactorily arranged, and the appointment of a receiver at the May term of the Superior Court at Waynesville, as was to be asked for, will be avoided. All the local creditors of Warren Jenks & McNeely, the builders of the road, have accepted an arrangement offered by the firm, and will withdraw the petition for a receiver. The firm has also arranged for a loan to pay off other claims against the road. It has 21⅛ miles of line in operation, from Hendersonville to Brevard, connecting at the former place with the Western North Carolina Division of the Southern.

Jacksonville, Tampa & Key West.—The sale of this road, which was to have taken place in Jacksonville on April 6, under a decree of foreclosure made by the United States Court in favor of the second mortgage bondholders, has been postponed until the first Monday in May.

Kansas City & Northern Connecting.—The stockholders of the railroad have voted to increase the capital of the company from $1,000,000 to $2,000,000 for the purpose of completing the construction work as soon as possible. The company's plans provide for connecting a number of short lines into one system: First, the Kansas City & Atlantic (Winner property) will be completed to Pittsburgh; a short road will then be built from Pattonsburg to Cainsville; the Quincy, Omaha & Kansas City will be extended from Trenton to Darlington, the latter point being on the Omaha & St. Louis, a line between Omaha and Pattonsburg, which was sold by Receivers some weeks ago to parties directly interested in the Kansas City & Northern Connecting; finally, by building a short line from Des Moines to Argus, Ia, and another from Quincy to Beardstown, a complete system will be made up of a number of short lines not now profitable. A number of Northern Missouri towns will then have direct communication with Kansas City. There will then be a short line between Kansas City and Omaha, and Kansas City and Des Moines.

Knoxville, Cumberland Gap & Louisville.—The Southern Railway Company has acquired, and will assume immediate possession of this road, extending from Knoxville north to Cumberland Gap, Tenn., a distance of about 65 miles, and has sold the Cumberland Gap tunnel and connections to Middlesborough, Ky., to the Louisville & Nashville, reserving trackage rights through and over the same. The Southern Railway will thus obtain access to the important coal, iron and other industries of the Middlesborough region, and establish a junction for the exchange of business at tnat point with the Louisville & Nashville.

Louisville & Nashville.—The Louisville & Nashville has bought the Middlesborough Belt road, which, together with the Cumberland Gap tunnel and that portion of the Knoxville, Cumberland Gap & Louisville Railroad which now forms the connection between the tunnel and the city of Middlesborough, Ky., will be added to its main line.

Louisville, Evansville & St. Louis.—The United States Court, at Springfield, Ill., has asked for and received the resignations of E. O. Hopkins and James H, Wilson as Receivers of the Western Division of the road, between East St. Louis and Mount Vernon, Ill., and the Court has appointed G. T. Jarvis as sole Receiver, taking effect on May 1. By this agreement the line will continue to be operated as one system. Mr. Jarvis had been previously appointed Receiver of the Eastern Division.

Mexican International.—The annual report of this company shows the following result:

	1895.	1894.	1893.
Gross earn	$2,664,136	$2,169,121	$2,050,933
Oper exp	1,597,355	1,281,816	1,311,394
Net earn	$1,066,771	$887,305	$719 539
P. c. exp. to earn	60	59⅛	63⅝
Ex. on pur. U. S. cur., etc	(Loss) 9,331	(Prof.) 196,122	(Prof.) 93,262
Total	$1,057,440	$1,083.432	$842,801
*Net earn	548,070	575,627	561.867
Other income	1,958	71,437	64,651
Total income	$550,028	$647,064	$626,518
Interest, etc	571,104	570,112	577,477
Deficit	$21,076	(Sur.) 76,952	(Sur.) 49,041

* This and the subsequent items are stated in United States currency.

Northern Pacific.—Holders of two-thirds of the company's securities have accepted the plan of agreement of reorganization dated March 16, and all other holders of the company's securities, not yet assenting to the reorganization plan, are notified that securities not deposited by April 23 will only be received on payment of a penalty.

Northern Pacific & Montana.—The bondholders' committee announces that it has made an arrangement with the Northern Pacific Reorganization Managers by which the bonds of the Northern Pacific & Montana may participate in such reorganization, receiving for each $1,000 present bond, with all unpaid coupons attached, $500 in the new 3 per cent. general lien bonds, bearing interest from Jan. 1, 1897; $500 in the new preferred stock trust certificates of the reorganized Northern Pacific Railroad Company. Holders of bonds of this company, in order to participate in this arrangement, are notified to deposit their bonds with Messrs. J. P. Morgan & Co., 23 Wall street, New York, not later than April 23.

Oregon Short Line & Utah Northern.—The Reorganization Committee of the company announce that the deposits in this country and Amsterdam amount to about 90 per cent. of all classes of bonds called for and a large majority of the stock.

Pittsburgh, Cincinnati, Chicago & St. Louis.—The company reports earnings for the year ending Dec. 31 as follows:

	1895.	1894.	Inc. or Dec.
Gross earn	$15,439,706	$14,247,855	I. $1,191,851
Oper. exp	11,248,545	10,765,520	I. 483,025
Net earn	$4,191.161	$3,482,335	I. $708,826
Total income	4,234,836	3,498,340	I. 736,468
Disbursements	2,678,426	2,566.037	I. 112,389
Revenue other roads	783,023	488,223	I. 294,800
Total revenue	$2,339,423	$1,420,526	I. $918,897
Rent and losses branch lines	1,316,535	785,043	I. 531,492
Surplus	$1,022,888	$635,483	I. $387,405
Dividends	.....	459,497	D. 459,497
Balance	$1,022,888	$175,986	I. $846,902

Pittsburgh, Marion & Chicago.—At the public sale of the road in Lisbon, O., on April 13, the property was bid in by a committee consisting of A. S Comstock, of New York; C. W. Bray, K. B. Battinger, J. W. Clark and D. B. Billingsley, of Lisbon. The road was appraised for $126,000 and it sold for $84,000. It extends from New Lisbon to New Galilee, Pa., 25 miles.

St. Louis, Alton & Terre Haute.—Spencer Trask & Co, of New York City, who have been the financial agents of this company in New York for many years, have entered into an agreement with the Illinois Central whereby that company, as the lessee of the road, has agreed to fund its indebtedness due and to become due under said leases, by issuing therefor, to those who may desire it, its St. Louis Division three per cent. gold bonds, due in 1951, upon certain terms and conditions. The bonds are to be secured by mortgage executed by the Illinois Central, dated Jan. 1, 1896. The essential point of the agreement is that the United States Trust Co. is authorized to receive the shares of the capital stock of this company, and to receive also the preferred shares of the Belleville & Southern Illinois, and issue therefor its certificates entitling the holders to receive $75 in par value of the gold bonds for each $100 in par value of the shares of the St. Louis, Alton & Terre Haute, and $160 in par value of the bonds for each $100 in par value of the Belleville & Southern Illinois preferred shares, so deposited. The trust company is to hold the bond as received from the Illinois Central until Jan. 1, 1898, subject to an option to Spencer Trask & Co. to purchase the bonds for cash, to be paid to the trust company for ratable division to the certificate holders at 90 per cent. of the par value with the unpaid interest accrued without any deduction for commission or charges of any kind. Holders of a majority of the shares have already signified their intention to make the deposit of their shares.

San Antonia & Gulf Shore.—This road, which has been built for about 30 miles out of San Antonia, Tex., and which has been in the Texas courts for some time, has been ordered to be sold on July 7 for not less than $150,000.

Southern Pacific.—Earnings for February are reported as follows:

	1896.	1895.	1894.
Gross earn	$3,702.490	$3.516.017	$3,021,872
Oper. expen	2,574,905	2,603,122	2,169,149
Net earn	$1,127.595	$912,895	$851.723
P. c. exp. to earn	69⅝	72⅜	71¾

Texas Trunk.—E. H. Pardee, who bought the road some time ago at foreclosure sale, last week paid $250,000 cash into the Federal Court at Dallas, Tex., and the property has been formally transferred to him. The road, extending southeast of Dallas, will be reorganized as the Dallas & Southeastern.

Electric Railroad News.

Baltimore, Md.—The City & Suburban Railway Co. is having plans prepared for a new steel car barn, 140×550 ft., to be erected on the Frederick road, opposite Loudon Park. The building will have storage capacity for 200 cars. The company has received about 15 new cars, the first of an order of 100, which are being built for delivery this spring. Of these 75 are open cars.

Carbondale, Pa.—Papers have been filed for the consolidation of the Carbondale & Forest City Passenger Railway Co. and the Carbondale Traction Co. The capital stock is $450,000.

Montreal, Que.—The Canadian Electric Railway & Power Co., which proposed to build an electric railroad from Montreal to Windsor, has had its application refused by the Railway Committee of the Dominion Parliment.

Newark, O.—On a petition of President Sheidler the Newark & Granville Electric Street Railway has been placed in the hands of J. F. Lingenfelter, Receiver.

Pittsburgh, Pa.—Mayor McKenna has signed the ordinances for a double-track electric railroad on Shady and South Highland avenues and on other streets in the East End.

Vancouver, B. C.—The franchise and property of the Victoria Electric Railway & Lighting Co. were sold last Saturday for $340,000.

TRAFFIC.

Traffic Notes.

During the months of February and March the steamers of the Flint & Pere Marquette took 164 full loads of flour and grain across Lake Michigan.

Denver papers report that the settlement of the freight rate war has not settled the prices of coal in that city, the shippers declining to make the changes necessary to produce the equalization desired by the railroad officers.

Judge Thompson has decided, at Salina, Kan., that the law of that state requiring railroads to provide track scales at numerous small stations is unconstitutional, the title of the act not clearly stating its purpose.

The Grand Rapids & Indiana and the Chicago & West Michigan have divided some of their competitive passenger traffic. The C. & W. M. will refrain from competing for the through traffic north of Grand Rapids and the G. R. & I., in return for this favor, will direct its passengers for Detroit and Chicago over the lines of the C. & W. M., as far as possible.

Numerous cattle shippers of Kansas have been constantly complaining since the railroads of that state, a few months ago, began charging for cattle according to actual weight instead of by the carload, at an estimated or assumed weight; and finally, after a hearing, the State Railroad Commissioners have ordered the roads to restore the carload rates. It is said, however, that this is an emergency order, pending further investigation, looking to a settlement upon a more equitable rate.

The leading merchants of Spokane have formed a freight association with W. D. Plant as President and T. S. Spencer Secretary. A local paper states that the city had such an association once before, about four years ago, but that as soon as the experienced traffic man who acted as Commissioner and secured favorable rates from the railroads had got most of the merchants' grievances redressed a number of prominent members backed out and the association fell to pieces. Besides this, a number of firms receiving large quantities of freight accepted favors from the railroads for themselves and then deserted their associates. The proposition now is to stand together through thick and thin. No member is to accept a reduced rate from railroads unless all the members of the association receive equally favorable treatment.

The Joint Traffic Association has suspended the rules of the association as to traffic to and from points in Virginia south of the line of the Chesapeake & Ohio. This is done to enable the lines in the association to compete with those outside of the association. The order says, however, that this suspension of rules shall not in any way detrimentally affect traffic to and from the other territory subject to the joint traffic agreement, and that export or import business, coming within the jurisdiction of the Joint Traffic Association, shall continue to be handled under its rules. The local territory of the Chesapeake & Ohio on the Kanawha River, in West Virginia, from St. Albans to Kanawha Falls, inclusive, where rates and fares are controlled by river competition, and in no manner affect Joint Traffic Association lines, is also excepted under the above conditions from the rules of the Joint Traffic Association. The principal competitor of the association in Virginia is the Norfolk & Western and the principal business taken by that road is that going to or from Europe, but as that is excluded it must be that the new order is chiefly for the benefit of the Chesapeake & Ohio in dealing with other competitive business.

Chicago Traffic Matters.

CHICAGO, April 15, 1896.

The work of revising transcontinental freight rates has been finished and the tariffs, which will go into effect May 1, are now being printed. As already published in the *Railroad Gazette*, the lowest rate on any commodity from New York to the Pacific coast will be 75c. per 100 lbs., while the lowest rates from Chicago will be 60 cents. The following tables, from advance proofs, show the new and old rates from the Pacific coast. The westbound rates will be the same as the eastbound. The new rates are lower than the present eastbound, but higher than the present westbound rates. The new figures from the Pacific coast are:

To all Missouri River points:

	1	2	3	4	5	A	B	C	D	E
New..	$3.35	$2.85	$2.50	$2.00	$1.70	$1.75	$1.55	$1.20	$1.15	$0.95
Old....	3.50	3.00	2.50	2.00	1.75	1.75	1.55	1.25	1.10	1.00

Rates to Mississippi River points are on the basis of $3.55, first class; to Chicago and Milwaukee, $3.70; to Cincinnati and Detroit, $3.75; to Pittsburgh and Buffalo, $3.80; to New York and Boston, $4. To the latter territory the other classes are: $3.50, $2.95, $2.30, $1.95, $2, $1.75, $1.40, $1.25, $1.15.

Commissioner Iglehart, of the Chicago Freight Bureau, has broken loose on the railroads once more. He gives out the startling information that his bureau is preparing a bill to be introduced at next winter's session of the Illinois Legislature that will compel railroad companies to pay demurrage to consignees for failure to deliver carload shipments on specified days and hours. As the bulk of the business intended to be covered by this "measure" is interstate, such a law would be a howling farce.

The roads west of Chicago have agreed to continue homeseekers' excursions through the coming summer. In addition to those already agreed to, the following excursions will be run from points west of the Missouri River: May 19, June 9 and 23, and July 7 and 21.

It is said that at the coming session of the Federal Grand Jury in this city, United States District Attorney Black will present evidence to indict a number of railroad officers and shippers for giving and receiving rebates and secret cut rates. Attorney Black refuses to divulge the names of the persons who are to be subpœnaed. He acknowledges that a number of railroad officers and shippers have been subpœnaed to appear before the coming grand jury. Little doubt now remains that Detective Marchand secured some evidence of cut rates on his recent visit to Chicago which will be presented for the consideration of the grand jury.

The Illinois and Indiana coal roads have agreed to a new tariff of coal rates to go into effect May 1. The new tariffs will advance the present rates from most of the coal shipping stations 5 cents a ton, but from some there will be reductions of from 2 to 5 cents a ton.

The executive officers of the Western roads are in daily session trying to solve the troublesome ten-ride party rate question. The rate has been entirely abolished by all but one or two roads. Theatrical people claim, of course, that they are suffering by the withdrawal of these tickets. The railroad officers seem to be unable to agree upon any plan to put the tickets on sale and keep them out of the brokers' hands. The same officers are considering plans to protect the 2,000 mile descriptive tickets from the scalpers. One plan suggested and which, it is hoped, will be put in force, is to sell the tickets at $50 and have the backs redeemed by the Western Passenger Association (instead of by the individual roads) at $10 each.

There was a big drop in eastbound shipments last week compared with the previous seven days. Suspicious persons attribute the decrease to a stiffening of rates on account of the Brown decision. The facts are that the falling off is due almost entirely to the large amount of grain that has been loading in vessels at Chicago and Milwaukee, the decrease in grain shipments alone amounting to more than 14,000 tons. The total shipments of freight, not including live stock, by all lines for the week ending April 11, amounted to 65,903 tons, compared with 82,694 tons during the preceding week, a decrease of 16,791 tons, and against 55,711 tons for the corresponding week of last year. The proportions carried by each road were:

Roads.	WEEK TO APRIL 11.		WEEK TO APRIL 4.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central	5,981	9.1	7,336	8.9
Wabash	5,760	8 8	6,276	7.6
Lake Shore & Mich. South.	9,221	13.8	9,771	11.8
Pitts., Ft. Wayne & Chicago	6,577	10.6	8,617	10.4
Pitts..Cin.,Chi. & St. Louis.	8.131	12.4	7,518	9.1
Baltimore & Ohio	5,777	8.8	6,470	7.8
Chicago & Grand Trunk	8,361	12.7	8.712	10.5
New York, Chic. & St. Louis	5,951	9.	6,711	8.1
Erie	7,425	11.3	17,428	21.1
C., C., C. & St. Louis	2,319	3.5	3.855	4.7
Totals	65,903	100.0	82,694	100.0

Of the above shipments 3,766 tons were flour, 36,117 tons grain and millstuffs, 8,107 tons provisions, 7,874 tons dressed beef, 899 tons flaxseed, 1,078 tons butter, 1,176 tons hides, and 4,448 tons lumber.